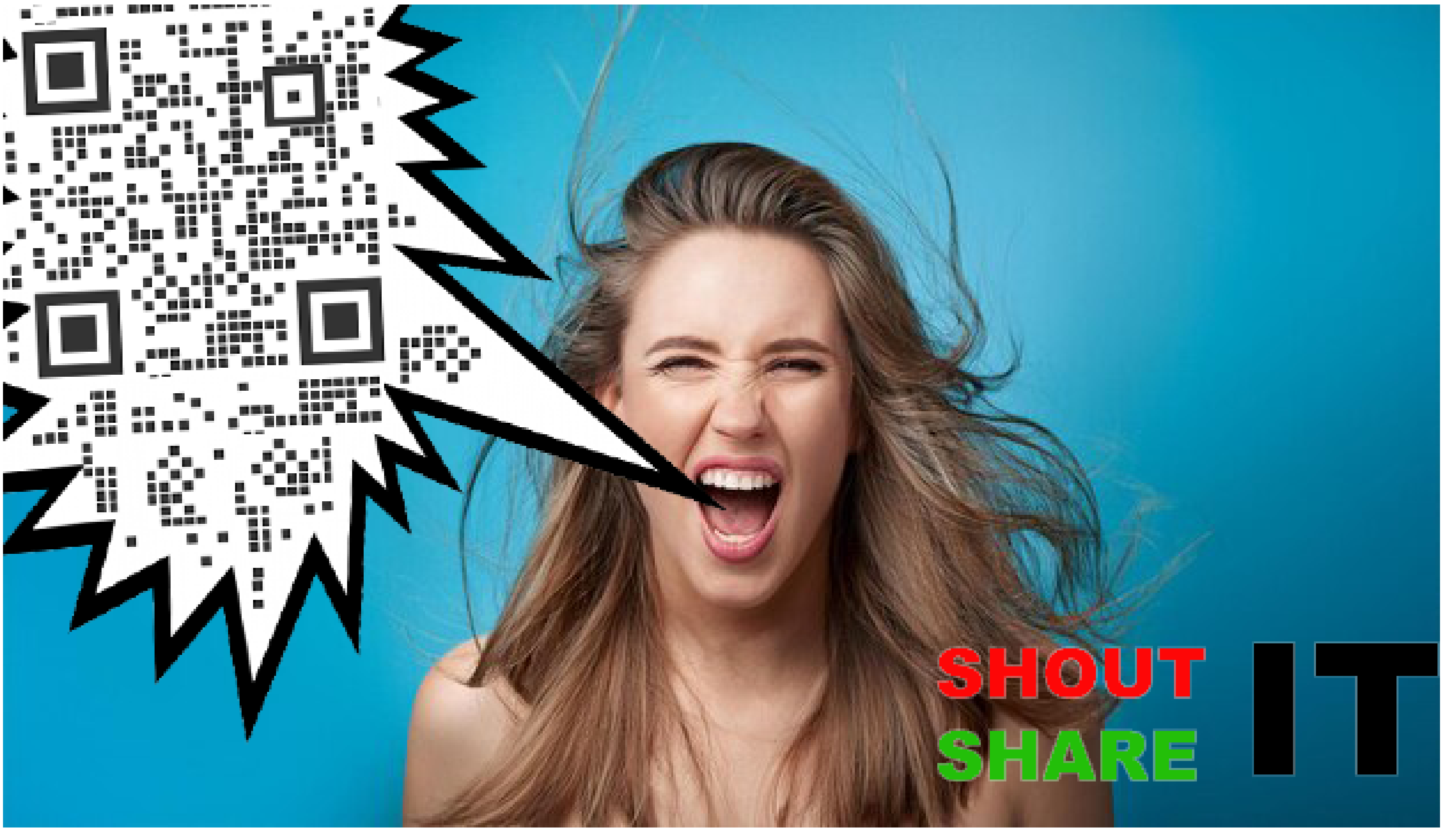
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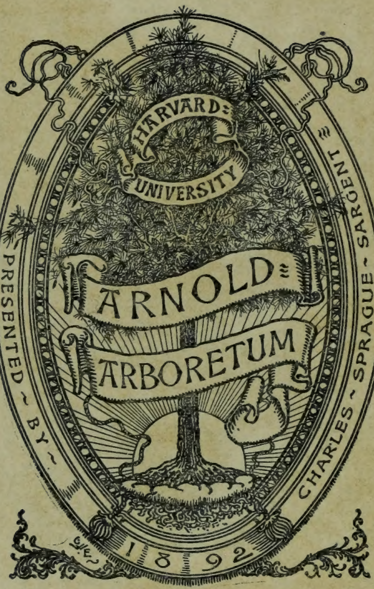

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ARNOLD ARBORETUM
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1892

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES

EDITED BY

H. N. RIDLEY, M. A., F. L. S.,
Director of Botanic Gardens, S. S.

AND

J. B. CARRUTHERS, F. R. S. E., F. L. S.,
Director of Agriculture & Government Botanist,
F. M. S.

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No. 1.] JANUARY, 1906. [Vol. V.

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NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, &c. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valua-"tion regarding new or little known natural or manufactured pro-"ducts of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M.A., F.R.S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given.

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

AGRICULTURAL BULLETIN

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No. 1.] JANUARY, 1906. [Vol. V.

EDITORIAL.

The Editor would always be glad to receive correspondence or notes on Agricultural or Horticultural subjects for the Bulletin and also photographs of plants or cultivation. He would call the attention of planters and others to the fact that when the Bulletin was started in its present form, many were the promises of support in these matters. During the past year hardly a note has been sent for the Bulletin by any of those who might reasonably have been expected to send some, while constantly articles of interest are heard of as published by them in fugacious daily papers.

The Bulletin has now a very large circulation all over the world, and it is preserved in all the bigger Libraries in the world, so that all articles published in it are always accessible to the public interested in agriculture, and always will be. Articles sent to newspapers, on the other hand, practically disappear as soon as they are printed, and are never permanently accessible. The progress of the agriculture of the Malay Peninsula of late years has been strikingly rapid, and is a matter of the greatest interest and it is of some importance that the various steps in its advance and the suggestions of planters and others for its improvement should be properly recorded. The correspondence to the Journal has, as will be seen by the Index, fallen off during the last two years to a very large extent. Everything received is printed as fast as the Printing Office can turn it out, but the amount received is smaller and smaller each year.

The Editor hopes that this year more correspondence, notes and articles may be sent and also that good photographs of planting or other subjects suitable for reproducing in the Bulletin may be forwarded to the Office of the Bulletin.—*Editor.*

Exporting Seed of Para Rubber.

As it is well known the seed of the Para Rubber tree deteriorates very rapidly after it is ripe and soon loses its germinating power, it is not always easy to send seed long distances without a very large percentage of losses, at the same time the demand for seed in distant parts of the world is very considerable and a good many experiments have been tried in the Botanic Gardens in various methods of packing to ensure their arrival in good condition. The reports received from the recipients of these seeds have been remarkably good, as the following records will show:—

Of 7,500 seeds sent to Jamaica on August 31st, were received on November 21st, and Mr. FAWCETT writes: "The 7,500 seeds sent in biscuit-tins are all germinating very well and we shall scarcely lose 500 of them."

One hundred were sent in a similar manner to Calabar on the date July 6th, and arrived on September 20th.

The Acting Secretary writes in reply: "The seeds were soaked in water for two days on their arrival and were then planted with the upper portion left above the soil. Ninety out of the hundred seeds have already germinated (Nov. 7th,) and appear healthy young plants.

To the Royal Gardens, Kew; 135 seeds were sent on July 6th, packed in charcoal, in a biscuit-tin. They arrived in a month, and 123 germinated.

In February 12th, 1903; 20 seeds were sent to Mr. J. C. HARVEY, Vera Cruz, Mexico, who writes, May 19th, 1903, that "out of the 20 seeds of *Hevea braziliensis* I have 14 young plants. They came up in a few days, and possibly a few more may germinate, though three seeds were decayed."

These were all sent in biscuit-tins. Those sent to Jamaica were packed in slightly damped incinerator earth, but it was necessary to replace the upper part of the packing with sawdust to reduce the weight, as incinerator earth is very heavy and the box, a two-pound tin, which contained 150 seeds, would have been over parcel post weight.

The other tins were filled with damp charcoal finely powdered. In packing, a certain amount of care is required in damping the charcoal so as to get it equally moistened, all through and not either over wet or over dry. This is best done by damping the charcoal thoroughly and then drying it in the sun constantly stirring and turning it over, till it is uniformly slightly damp.

The incinerator earth which had been exposed to the elements was damp when received and only wanted partial drying to fit it for packing. Its weight is against its use, but both it and the powdered charcoal have the great advantage of preventing any attacks of mould or bacteria likely to cause decomposition.

Other experiments with powdered coir fibre, and coir dust, saw dust and variously prepared soils have been tried but the results do not seem to have ever been as successful. One experiment was made in putting the seeds in water for a month, but though that might be effective for a fortnight or so, they had all perished by the end of the month.—H. N. R.

MIMUSOPS ELENGI SEEDS.

The Bunga Tanjong (*Mimusops elengi*) a common cultivated tree here, belongs to the order of *Sapotaceœ*, and as many of the seeds of trees belonging to this order contain an oil of value, the attention of Mr. ALLAN of the firm of Mr. GROSFIELD of Warrington was called to this seed which on crushing was found to be very oily. A number of seeds were collected and forwarded to the firm for investigation. Messrs. GROSFIELD had the seeds submitted to chemical analysis, with the result as shewn in the following letters. The oil is said in WATT'S Dictionary to be used in India for culinary purposes burning and medicine, and also according to BEDDOME it is employed by painters. A product however, which may be used by natives in its country with some advantage, may not be of sufficient value for the trade in Europe, as is the case with this plant.

The following letters were received from Messrs. Grosfield:—

Dear Sir,

We have examined the small parcel of seeds which you sent on to our Mr. ALLAN, and enclose with this the results which have been obtained. You will see that the material is practically useless from a technical point of view, as the percentage of oil is so low that its value probably would not pay the freight from Singapore to Europe, to say nothing of making a little return to the collectors.

We are pleased to make such examinations as this, as besides being interested in such matters from the point of view of possible users of the materials under examination, we also have a natural scientific interest in such investigations, and are prepared to examine any other materials of alike kind which you will take the trouble to send to us.

Yours faithfully,

FOR JOSEPH GROSFIELD & SONS, LTD.,

J. A.

REPORT ON SEEDS

"MIMUSOPS ELENGI"

Sent by H. N. Ridley, Esq., Botanic Gardens, Singapore.

The seeds are of a flat bean shape and have a hard glossy brown shell.

Shell	59·9 %
Kernel	40·1 ,,

The kernel contains 14·47 % of oil which is equal to 5·8 % on the whole seed.

Constants of Oil.

Saponification Equivalent ...	289·8
Free Fatty Acid	2·4 %
Iodine number	74·45
Unsaponifiable	2·56 %
Melting point of fatty acids ...	31·3° C.

The oil is of a dirty brown colour and is considerably improved in colour by treatment with caustic alkalies.

It is evident that it would not be profitable to extract the oil from this material as the yield would be very small and the technical difficulties of handling a seed with such a large percentage of so hard a shell are very great.

JOSEPH GROSFIELD & SONS, LTD
per J. A.

PLANTATION RUBBER.

THE QUESTION OF QUALITY.

In the first place comes a letter from the managing director of one of the first rubber factories in Great Britain to experiment with Ceylon rubber. He writes:

"We have only as yet used plantation rubber experimentally and sparingly. Until it arrives in greater quantities it is too dear for the general trade, since the solution makers can afford to pay 2 pence a pound more for it than ordinary mechanical manufacturers. When it arrives in excess of the solution requirements, the prices will rectify themselves.

"We don't make solution for the trade, but merely for our own requirements. The quantity from any one estate is yet too trivial to be worth much attention, and as yet the London auction sales offer the best choice for the buyer and best price for the seller.

"The qualities vary even from the same estate, according to the age of the trees, whilst yet so young. We judge that the rubber has not attained its full strength till the tree is at least 8 or 9 years old; younger than that, though good gum, it has not the strength of hard cure Madeira fine Para, and is uneven in strength. There is no difference noticeable in the rubber from 8 year old trees from different plantations. We have used about 4 to 5 tons in testing it, from about 20 plantations. As yet it is not safe to use for the finest work, such as India-rubber thread and the best bladders, but where a 'weak Para' will do it is all right.

A member of the British rubber trade, though not at present a manufacturer, to whom the preceding lines were shown, offers this suggestion:

"It is true that an absolutely fair test of plantation rubber in comparison with Brazilian Para rubber has not yet been possible, owing to the fact that the Ceylon and Straits products so far have been marked in such small lots—though the aggregate may have been important—and varying so in quality and condition that the manufacturer seeking to use these sorts has been unable to obtain either an important quantity at one time or an assured supply of a given quality for regular consumption. These things will right themselves, however, with the increasing production of the plantations and the better care in the preparation of the rubber. But there is something for the manufacturer to do as well as for the planter, in arriving at the best possible results from the new class of rubber. For instance, the manufacturer here quoted is of the opinion that the Ceylon rubber is not safe to use in making rubber thread. But the nature of his tests is not indicated. The fact that this rubber has not given good results for thread under the established practice in his factory is by no means conclusive. Possibly with a variation from his practice, for instance in regard to vulcanization, a thread equally as good as any other in market might be produced. The whole industry will recall the variations from any former practice which were rendered necessary after the introduction of Africans before satisfactory results were obtained, but now the consumption of Africans has become very large, and for many purposes with as good results as from the best Para sorts. In fact, there are uses for which some of the Africans are preferable to Para rubber."

A firm of London rubber brokers write to the "India Rubber World" as follows in regard to plantation rubber in the Far East:

"At present the quantities have not been sufficiently large to be taken generally by manufacturers, and it has yet to be ascertained for what purpose these new plantation rubbers are most suited, and how results compare with ordinary fine Para. There is no doubt that for some special purposes the pancake and sheet rubber both from the Malay States and Ceylon have been found very suitable, and a very convenient form of preparation, but it will have to come in much larger quantities before it can establish its proper place in competition with fine Para, and be generally used by manufacturers who must have regular supplies. Up to now we have found very few consumers to look with favour upon the washed and crepe rubber, and they nearly all say they prefer the biscuits or sheets, and will do the washing themselves. The crepe and washed rubber is liable to heat en route, which is against it."

India Rubber World, December 1st, 1905, p. 72.

THE ENGKALA.

A New Fruit.

The Engkala fruit seems to have been long known in Sarawak by the Dyaks and Europeans but is apparently quite unknown outside that country. BECCARI mentions it in his travels in Borneo, but had no flowers by which to identify the species, and gives no description of the tree. I found it beautifully in flower in Sarawak in September, 1905, in the town of Kuching, and later Mrs. ELLIS and Mr. HEWITT sent me seeds and fruits of it.

The fruit is rounded flattened at both ends about 1½ inch through, and of a pink colour. It contains one large rounded flattened seed. The pulp round the seed is of the same consistency and colour, green and yellow, of that of the Avocado Pear, which in flavour, it is said, much to resemble. The fruits I received from Mr. Hewitt were too ripe to eat, but I am assured by all that the flavour is delicious.

The wood is not used being quickly destroyed by termites. An oil is extracted from the seeds by the natives but for what use is not known.

The fruit can be eaten raw like an Avocado Pear, or it is used in curries as a sumbul. Mrs. Ellis tells me she has made a very pleasing dish by extracting the stone and filling the space with Mayonnaise Sauce, the fruit being previously cooked. The Dyaks scald it and eat it with salt. The tree is well worth cultivating not only for its fruit but for its intrinsic beauty. It is a tree of large size with dark green leaves glaucous beneath. The flowers produced in vast abundance are yellow, so plentiful indeed are they that the ground beneath the tree when I saw it was quite covered with those that had fallen.

Like the Avocado Pear (*Persea gratissima*) the tree belongs to the order *Laurineæ* and to the very large genus *Litsea*.

The following is a description of the plant:—

Litsea persella. n. sp.—A tree of great size, 40 to 60 feet tall with a stout stem. Leaves lanceolate inæquilateral, apex of the midrib prolonged beyond the blade to form a mucro, base cuneate, above deep green coriaceous shining beneath glaucous, nerves elevated beneath slender 13 pairs, 9 inches long 3 inches wide, alternate petiole half an inch long. Racemes axillary 1½–2 inches long, rachis angled pubescent. Heads of flowers 2 or 3 together on a short silky pubescent peduncle. Male flowers, bracts 3 ovate silky pubescent obtuse keeled. Flowers 5 on short thick silky pedicels. Perianthlobes 3–4 unequal ovate or linear—ovate silky, a few scale like processes at the base of the stamens. Stamens 12 filaments slender hairy.

The female flowers I have not seen. The fruit is borne in a green cup 1¼ inch across, and shallow with a thickened obconic base an inch long.

Fruit globose with slightly flattened top, 1½ inch through, smooth shining red, pulp thick fleshy green. Seed rounded-flattened nearly an inch through shining pale brown.

H. N. Ridley.

NEW PALMS AND AROIDS.

The following palms have been added to the collection in the Botanic Gardens since the previous list was published in the Bulletin:—

Pinanga sp.	Borneo
P. acaulis Ridl. ...	Perak
Ptychosperma, n. sp.	Solomon Islands
Geonoma, n. sp.	Mexico

Maloritie agracilis	Mexico
Martinezia corallina Mart.	Guiana
Arenga Listeri Hemsl.	Christmas Island
Livistona Woodfordi Ridl.	Solomon Islands
L. sp.	Philippines
Pritchardia sp. with long pendent spikes	
Inodes Causiarum	Cuba
Trincona alta	Portirico
Thrinax argentea Lodd.	West Indies
Th. multiflora Mart	
(Th. graminifolia Hort*)*	S. Domingo
Sabal Adansonii Gaertn.	U. S. A.
S. Mexicana Mart.	Mexico
Attalea spectabilis Mart	Brazil
Borassus Machadonis Ridl.	Perak
Calamus rudentum Thw.	Ceylon
C. sp. (Manok Telor)	Negri Sembilan
C. rivalis Thw.	Ceylon
C. rubiginosa, n. sp.	Sarawak
C. Rotang Lour.	Saigon
Zalacca borneensis Becc.	Borneo

AROIDS.

The following list contains the Aroids cultivated in the Botanic Gardens which have been identified or added since the last list was published. Dr. ENGLER the well known authority on these plants visited Singapore in December, and identified the species of which the names had been lost.

Arisæma umbrinum Ridley.	Sarawak
Typhonium album Ridley.	Sarawak
Homalomena Lindeni (Alocasia Lindeni Hort.*)*	New Guinea
Caladium marmoratum Math.	S. America
Piptaspatha insignis Brown.	Sarawak
Aglaonema Brownei Prain.	Dindings
Culcasia scandeus Beauv.	Trop. Africa
C. Mannii (Aglaonema Mannii)	Trop. Africa
Zamioculcas Boivini Decne.	Zanzibar
Philodendron cannæfolium, Mart.	Brazil.
Ph. sagittifolium, Liebm.	Mexico.
Ph. Imbe, Schott.	Brazil.
Ph. melanorrhizum, Andre.	Colombia.
Ph. squamiferum, Poepp.	Brazil.
Ph. laciniatum	
Syngonium auritum, Schott.	Mexico.
S. albo-lineatum, Bull.	Mexico.
Anthurium digitatum, Don.	Peru.
A. olfersianum, Kunth.	Brazil.
A. regale, Andre.	Brazil.

Scindapsus Scortechinii, Hookfil. ...	Perak.
Raphidophora Lobbii, Schott, ...	Singapore.
R. grandis, Ridl. ...	Sarawak.
Pothos scandens, Lour, Var. ...	Sarawak.

HIGH PRICE FOR RUBBER.

The *Times of Malaya* reports that at an auction sale in Singapore, on July 26th, $4.10 cents per lb. was paid for Para sheets from Plang Estate, Sungei Siput, owned by EDWIN PHILIPS. This price at the exchange rate of the day was equivalent to 6/11½, and is almost the highest price on record.

The latest sale price received (December 8, 1905.) gives 6/1¼, as the highest price for biscuits, Scrap fetched from 3/6 to 5/5¾, per lb. Assam rubber fetched 3/7¾, for fair quality. Rubber seed was shipped in some quantity from Ceylon, but all bought in.

A BIG AFRICAN RUBBER COMPANY.

We see that a very large rubber Company for Africa is being formed under the name of the Liberian Rubber Corporation, among the directors of which are Sir HARRY JOHNSTON and Sir T. WEST RIDGEWAY. It is intended to work an enormous area of rubber producing forest, 20,000 square miles which produces *Landolphia Owariensis* and two other species of *Landolphia*, *Clitandra nitida* and *membranacea*, *Carpodinus Oocarpa* and another species, *Rawwolfia vomitoria*, *Funtumia elastica*, *Ficeus Whytei*, *Johnstoni Guineensis*, *Barteri* and other species. Labour is plentiful and planting these rubber plants in the forests will be continued. It is proposed to have 30 stations for collecting the rubber. This rubber is not of the best quality but sells at 2/8¼ to 2/9¼ per lb. and it is expected after all expenses have been deducted to get a profit of about £125 per ton. It is expected to obtain 500 tons of rubber per year from this region.

ANIMAL AND FUNGUS PESTS OF FICUS ELASTICA IN JAVA.

In Bulletin No. 3 of the Algemeen Proefstation of Salatiga (1905) Dr. S. H. KOORDERS and Dr. L. ZEHNTER, give an account of the pests injurious to the Rambong in Java. Among the animals the Kijang (*Cervulus muntjac*) and probably the Kanchil eat the leaves of the young plants. Among *Coleoptera*, *Batocera albofasciata*, a species of *Epicedia* and *Petrognatha gigas* var *spinosa* bore up the stems in a larval state. *Abirus picipes*, a leaf-eating chafer gnaws the leaves of young plants. Of Lepidoptera *Hypsa egens*, *Porthesia xanthorrhœa*, *Dasychira*, *Ocinaria signifera*, *O'dilectula* and *Glyphodes bivitralis* and two Psychid caterpillars have been found attacking the leaves. A figure of the *Glyphodes* moth and larva, and a plate of young leaves attacked by the caterpillar are given. These Glyphodes are very destructive and alas common every where.

Of Bugs *Hemiptera a Helopeltis* and the blights *Aspidiotus rapax Lecamium depressum, L. longulum, L. hesperidum, Chrysomphalus ficus*, a *Dactylopius* and a *Diaspid* are also troublesome.

Of grasshoppers, a large green grasshopper *Cleandrus graniger* and a *Gryllacris* are destructive.

The *Cleandrus* lays its eggs in slits in Cocoa-tree twigs, just as the Coffee Locust *Cyrtanthacris varia* does in coffee and other shrubs here.

Termites (species unknown), a mite *Iphidulus longicaudus*, and a well known nematode worm which attacks the roots of young plants *Heterodera radiciola* complete the list.

Two new leaf-fungi are described by Dr. KOORDERS, *Colletotrichum ficus* appearing when ripe as raised dots in lines and *C. elasticæ* small black tufled spots on leaves of young plants. Complete figures and accounts are given of these plants.

H. N. R.

PERSONAL AND OTHER NOTES.

Mr. P. J. BURGESS, the Government Analyst, is leaving Government Service, to take up the management of the great Bukit Asahan estate in Malacca.

Mr. J. B. CARRUTHERS the Director of Agriculture in the Federated Malay States is pushing on his department with energy. We hear that a chemist from Professor DUNSTAN'S laboratory at the Imperial Institute is to be added to the staff as well as an entomologist, and a Curator for the Gardens at Kuala Lumpur. Mr. CARRUTHERS has accepted the post of Co-editor of the Agricultural Bulletin with the Director of Gardens.

All who know and admire the beautiful Gardens at Penang will be glad to hear that the Municipal Council of Penang has decided at length not to apply for this picturesque spot to convert it into a reservoir, a horrible fate which has been impending for some three years.

Professor ENGLER, Director of the Imperial Gardens of Berlin the well known authority on aroids is travelling in the East. He spent some time in the Botanic Gardens of Singapore, collecting and examining the flora, especially the plants of his favourite group. He seemed much surprised to find so large a collection of living and dried aroids in the Botanic Gardens.

The Agricultural Journal of India is a new publication emanating from the Agricultural Research Institute at Pusa. The publication appears quarterly, at a subscription rate of six Rupees per annum.

The first number contains articles on the manuring of Sugar cane, and the Samalkota Sugar cane farm, the Wilt disease of Pigeon pea and Pepper, Insect pests of Cotton, Orange cultivation and Fermentation as applied to Agriculture. The Journal is well illustrated by photographs.

The F. M. S. Agricultural Department, on the initiation of the Perak Resident, will shortly start nurseries and supply natives with sago palm to plant up swampy land. The attaps of the sago palm are of the best quality and cannot be purchased under $45 to $50 per 1,000 at present. *Malay Mail, Feb. 8th,* 1906.

Notice to Subscribers.

Owing to the fixing of the exchange of the Dollar at 2/4*d.* it is necessary to alter the price of the Bulletin to Subscribers outside the Malay Peninsula and Subscribers in India and Europe are requested to take notice that the future price of the Bulletin will be for Subscribers in India and Ceylon—Rs. 6 ans. 8 and for Europe 9 Shillings per annum.—*Editor.*

Rubber Notes.

Gold Coast.—Mr. JOHNSON'S report of the Botanical and Agricultural Department of the Gold Coast for 1904, has just come to hand. He obtained a good valuation for samples of Para rubber though the percentage of resin was higher than it should have been but this was probably due to its having been taken from young trees. Interest is being taken in the planting of this tree, 55,000 seeds were distributed and there was a good demand for them. Samples of the rubber were sent to the St. Louis Exhibition. The rainfall at Aburi is given for ten years, and varies from 32 to 58 inches in the year. This is not at all the climate we should expect Para rubber to grow and thrive in, so that one would be glad to have some returns in the matter of growth of the trees and yield of rubber from such a comparatively dry country.

GOW, WILSON & STANTON, LIMITED.
India Rubber Market Report.

13, ROOD LANE, LONDON, E.C.
5*th January*, 1906.

At to-day's auction, 233 packages of Ceylon and Straits Settlements Plantation grown rubber were offered, 183 of which were sold. This was a very interesting offering amounting in all to nearly ten tons, Ceylon contributing about 3¼ tons and the Straits 6½ tons. There were several good sized parcels both of fine washed crape, sheet and biscuit, an exceptionally attractive one consisting of 33 cases of very fine long sheets cut in strips from the Bukit Rajah Co., for which, however, the owners' idea was not obtainable in the room. In addition to this grade the invoice included 19 packages of other kinds, the total weight amounting to just over two tons.

For finest quality 6/1½ was the price generally paid, one or two lots realising 6/1¾, and 2 cases of washed crape brought 6/2.

There were also some nice parcels of scrap which were well competed for, prices ranging from 5/- to 5/6¾ for fine qualities down to 3/4¼ for the lowest grades.

Average Price of Ceylon and Straits Settlements Plantation Rubber.

183 packages at 5/10 per lb., against 66 packages at 5/10¼ per lb. at last auction. Particulars and prices as follows:—

Ceylon.

Mark.	Quantity.	Description.	Price per lb.
Tallagalla	3 cases	Good palish to dark cloudy biscuits	6/1½
Do.	1 case	Good clean palish scrap	5/3¼
Sorana	2 cases	Fine palish biscuits	6/1¾
Do.	1 case	Fine palish to darkish biscuits	6/1½
Warriapolla	2 cases	Very fine pale amber biscuits	6/1¾
Do.	3 cases	Fine pale biscuits	6/1½
Do.	2 cases	Fine clear palish biscuits	6/1½
Do.	1 case	Good Do.	6/-
Do.	1 case	Fine very dark biscuits	6/-
Ambatenne	3 cases	Fine palish biscuits	6/1½
Do.	2 cases	Good darkish scrap	5/-
F B	2 cases	Fine pale washed worm	Bought in.
Gikiyanakande	5 cases	do.	do.
Hetherley	1 case	Fine darkish scrap	4/11
Culloden	4 cases	Fine pale amber biscuits	6/1½
Do.	2 cases	do. (rather mixed)	6/1
Do.	1 case	Good cuttings	5/2½
Do.	3 cases	Fine palish scrap	5/3¾
Do.	2 cases	Dark scrap	3/4¼
Ellakande	1 case	Fine palish to dark biscuits	6/1½
Do.	1 case	Fine palish scrap	5/3
Do.	1 case	Good darkish biscuits	6/1½
Do.	1 case	Good darkish scrap	5/1¼
Ingoya	4 cases	Very fine clear amber biscuits	6/1¾
Do.	1 case	Fine palish and darkish biscuits	6/0½
Do.	2 pkgs.	Fine clean scrap	5/1
K K	3 cases	Fine palish to dark biscuits	6/1¼
Do.	1 bag	Good scrap and cuttings	5/1¾
Halwatura	5 cases	Fine palish to darkish scrap	5/3¾
Katugastota	1 case	Fine palish and darkish biscuits	6/1½
Halgolla	1 case	Fine pale amber and dark biscuits	6/1½
Galatura	1 case	Fine large darkish biscuits	6/1½
Halgolla	2 cases	Fine pale and dark biscuits	6/1½
Madampe	1 case	Good palish to darkish biscuits	6/1½
Do.	1 bag	Palish scrap	3/6
Bandarapola	1 case	Good pale Ceara biscuits	Bought in
Wakaraka	1 case	Good palish biscuits	6/1½

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
Doranakande	2 cases	Fine palish scrap	5/3
Do.	1 case	Good darkish scrap	4/10
Do.	2 cases	Fine palish to dark cut sheets	6/1½
Do.	1 bag	Good scrap	5/-
		Straits Settlements.	
W P M Telok Batu	7 cases	Fine amber sheet	6/1½
Do.	1 bag	Good palish dull sheet	6/1
Do.	1 bag	Fine Rambong Sheet	4/6
Do.	1 case	Good palish scrap	5/4
Do.	1 bag	Good pressed Rambong sheet	4/6
B L C A	5 cases	Fine pale washed crape	6/1½
Do.	1 case	Fine amber sheet and biscuit	6/1½
Do.	1 case	Palish to dark crape	Bought in
Do.	1 case	Fine amber sheet	6/1½
SP	3 cases	Fine palish biscuits	6/1½
Do.	1 case	Fine clean scrap	5/2
SP S	2 pkgs.	Thick scrappy biscuits and darkish scrap	5/-
Do.	1 case	Rejected biscuits and scrap	5/-
S R C	27 cases	Good large palish to dark biscuits	6/1½
L & P F M S	5 cases	Fine pale washed ribbon	6/1¾
Do.	2 cases	Fine pale washed crape (in rolls)	6/0½
Do.	1 case	do. darker	5/10½
Do.	1 case	do. darker	5/7¼
D K P C L	4 cases	Fine palish biscuits	6/1½
Do.	2 cases	Fine pressed scrappy sheet	5/6¾
Do.	2 cases	Good palish scrap	5/3½
A G & Co.	1 case	Fine palish to darkish cut sheet	6/1½
B R R C O	33 cases	Very fine palish amber long strips	6/1½ offered.
Do.	1 case	Good rejected biscuits and sheet	Bought in
Do.	8 cases	Good palish to darkish scrap	5/3½
Do.	2 cases	Good clean palish scrappy sheet	5/3¾
Do.	1 bag	Good scrap	5/2
Do.	5 cases	Pressed dark Rambong scrappy sheet	5/2
Do.	1 case	do.	5/1½
Do.	1 case	Fine clean red Rambong	Bought in
Highland Estate	7 cases	Fine palish washed crape sheet	Part sold 6/2
Do.	5 cases	do. darker greyish	6/
Do.	2 cases	do. palish to dark	5/4¾
Do.	3 cases	Fine darkish scored sheet	Bought in
Do.	4 cases	Fine palish washed crape sheet	5/10
Do.	9 cases	do. greyish to dark	5/1½
Do.	4 cases	Darkish washed crape sheet	5/3

ASSAM RUBBER.

Assam and Rangoon were only represented by 14 packages, 8 of which consisted of fair red No. 1, which realised 3/6.

13, ROOD LANE, LONDON, E.C.
January 19th, 1906.

At to-day's auction, 110 packages of Ceylon and Straits Settlements Plantation grown rubber were offered, 96 of which were sold. This was only a comparatively small offering, the total weight amounting to about 6 tons, 3¾ from Ceylon and 2¼ from the Straits Settlements.

Competition generally was not quite so keen, and though a few parcels of fine quality again realized 6/1½, some good biscuits was also disposed of down to 5/11 per lb., the price generally paid averaging about 6/1.

Scrap also was in rather less demand, prices ranging from 3/5 for poor quality up to 5/3½ for fine.

The most important invoice was from the Vallambrosa Company consisting of 30 cases, the bulk of which sold from 6/0½ to 6/1 per lb.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

96 packages at 5/9¾ per lb., against 183 packages at 5/10 per lb. at last auction. Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
Ellakande	1 case	Fine darkish biscuits	6/1
Do	1 case	Fine palish scrap	5/-
Heatherley	4 cases	Fine pale and darkish biscuits and sheet	6/1
Do.	2 cases	Fine palish scrap	5/3½
Do.	1 case	Good darkish scrap	3/6
Nikakotua	3 cases	Fine palish and darkish biscuits	6/0½
Do.	1 case	do. darker	6/-
Do.	1 case	Good scrap	4/11¾
Do.	2 cases	Fine palish and darkish biscuits	6/0½
Do.	1 case	Good do. darker	6/-
Culloden	4 cases	Very fine amber biscuits	6/1½
Do.	1 case	Good palish and darkish biscuits	6/-
Do.	1 case	Good Cuttings	5/3
Do.	3 cases	Fine palish scrap	5/3½
Do.	1 case	Darkish scrap	3/6
Ellakande	2 cases	Fine palish and darkish biscuits	6/1½
Do.	2 cases	Fine palish scrap	5/0¾
Nikakotua	3 cases	Fine palish biscuits	6/0½
Do.	1 case	Good darkish do.	5/11
Heatherley	4 cases	Fine palish sheet and biscuits	6/1½
Do.	2 cases	Fine palish and darkish scrap	5/3½
Do.	1 case	Dark scrap	3/6
◇ PES	6 cases	Fine darkish scrap	Bought in
Culloden	2 cases	Fair darkish scrap	3/5
Heatherley	1 case	Good palish scrap	Bought in

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
Rangbodde	1 case	Fine pale Ceara biscuits	6/-
Glenesk	2 cases	Fine palish biscuits	6/1½
Elston	1 case	Fine palish and darkish biscuits	6/1½
Tallagalla	1 case	do. do.	6/1½
Do.	2 cases	Darkish scrap	Bought in
Maddagedera	3 cases	Fine palish to darkish scrap	do.
No mark	1 bag	Fine biscuits and scrap	do.
		Straits Settlements.	
P R S B	3 cases	Fine large amber sheet	6/1½
Do.	1 case	Good darkish scrap	5/0½
G M S B	8 cases	Fine amber sheet	6/1½
Do.	1 case	Good palish scrap and darkish scrappy sheet	5/-
V R Co., Ltd. Klang FMS	6 cases	Fine palish cut sheet	6/1
Do.	16 cases	do. darker	6/0½
Do.	1 case	Fine palish and darkish pressed scrappy sheet	5/3¼
Do.	4 cases	do. do. darker	5/3¼
Do.	1 case	Good darkish scrap	4/6
Do.	1 case	Fine darkish pressed sheet	5/10¼
Do.	1 case	Good do.	5/1
S H	1 case	Fine scrappy sheet	5/6
P R B N A	3 cases	Very fine pale thin sheet	6/1½
B L C B	1 case	Fine dark crape	Bought in

REGISTER OF RAINFALL AT NEGRI SEMBILAN HOSPITALS, FOR DECEMBER, 1905.

Date.	Seremban.		K. Pilah.		Tampin.		Jelebu.		Port Dickson.		Mantin.	
	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.
1	...	41	...	...	...	20	...	05	...	...	...	03
2	1	14	...	14	...	...	...	02	...	...	...	47
3	...	16	...	23	...	...	...	...	...	13	...	...
4	...	12	...	11	...	33	...	12	...	70	...	14
5	1	72	...	14		20	...	14	...	67	...	99
6	...	22	...	63	...	22	...	18	...	...	...	09
7	1	02	1	89	2	40	...	53	...	77	...	49
8	...	...	...	...	...	10	...	44	...	...	...	...
9	...	...	...	...	...	...	...	...	...	...	...	10
10	...	26	...	...	...	...	1	08	...	...	...	...
11	...	24	...	...	...	...	...	...	...	...	...	...
12	...	18	...	20	...	...	...	02	...	07	1	03
13	...	16	...	11	...	87	...	05	...	04	...	...
14	1	24	...	..	...	74	...	...	..	04	...	22
15	...	13	...	05	...	10	...	14	...	...	...	...
16	...	...	...	...	...	...	...	...	...	...	...	...
17	...	...	...	...	...	...	..	16	...	...	...	...
18	...	...	...	...	...	...	...	02	...	...	...	...
19	...	..	...	34	...	04	...	24	...	78	...	...
20	...	...	...	02	...	...	...	05	...	...	...	...
21	...	52	...	69	...	...	...	26	1	15	...	56
22	...	23	...	09	...	05	...	06	...	...	...	04
23	3	...	...	22	...	...	...	10	...	...	3	05
24	...	32	...	04	...	...	...	13	...	65	...	...
25	...	73	...	...	...	...	...	...	...	24	...	14
26	...	32	...	96	...	...	...	04	...	...	...	48
27	...	...	...	...	...	50	...	...	...	...	...	02
28	...	41	...	...	...	...	...	25	...	...	...	...
29	1	42	...	04	...	...	...	80	...	...	...	...
30	...	11	...	08	...	15	...	15	...	86	...	...
31	...	...	...	16		30	...	21	...	05	...	22
Total	11	06	6	14	6	20	5	24	6	15	8	07

State Surgeon's Office,
Seremban, 12*th January*, 1906.

R. VAN GEYZEL,
Apothecary.

SINGAPORE MARKET REPORT.

January, 1906.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	$ c.	$ c.
Coffee—Palembang	...	24.00	22.50
Bali	...	20.50	20.50
Liberian	96	21.50	20.00
Copra	1,678	7.65	7.05
Gambier	1,886	7.85	7.45
Cube Gambier, Nos. 1 and 2	210	12.50	10.50
Gutta Percha, 1st quality	...	300.00	150.00
Medium	...	200.00	90.00
Lower	...	80.00	12.00
Borneo Rubber 1, 2 and 3	...	131.00	85.00
Gutta Jelutong	...	6.00	5.50
Nutmegs, No. 110's	...	30.00	28.00
No. 80's	...	50.00	47.50
Mace, Banda	...	76.00	69.00
Amboyna	...	54.00	51.00
Pepper, Black	1,765	21.37½	20.37½
White (Sarawak)	363	31.00	30.00
Pearl Sago, Small	250	4.55	4.45
Medium	30	5.00	5.00
Large	...	...	...
Sago Flour, No. 1	3,310	2.97½	2.60
No. 2	317	1.00	0.87½
Flake Tapioca, Small	728	8.75	7.75
Medium	70	...	...
Pearl Tapioca, Small	263	8.25	7.35
Medium	374	8.60	7.50
Bullet	...	...	...
Tin	2,905	85.62½	82.62½

Closing fair.

Export Telegram to Europe and America.

For Fortnight ending 15th January, 1906.

Wired at 4 p. m. on 16th January, 1906.

				Tons.
Tin	Str.	Singapore & Penang to	United Kingdom &/or	1,501
Do.	,,	Do.	U. S. A.	1,040
Do.	,,	Do.	Continent	540
Gambier	,,	Singapore	Glasgow	...
Do.	,,	Do.	London	50
Do.	,,	Do.	Liverpool	375
Do.	,,	Do.	U. K. &/or Continent	50
Cube Gambier	,,	Do.	United Kingdom	75
Black Pepper	,,	Do.	Do.	60
Do.	,,	Penang	Do.	...
White Pepper	,,	Singapore	Do.	100
Do.	,,	Penang	Do.	...
Pearl Sago	,,	Singapore	Do.	90
Sago flour	,,	Do.	London	250
Do.	,,	Do.	Liverpool	950
Do.	,,	Do.	Glasgow	200
Tapioca Flake	,,	Singapore & Penang	United Kingdom	550
T. Pearl & Bullets	,,	Do.	Do.	500
Tapioca Flour	,,	Penang	Do.	625
Gutta Percha	,,	Singapore	Do.	85
Buffalo Hides	,,	Do.	Do.	100
Pineapples	,,	Do.	Do.	cases 40,000
Gambier	,,	Do.	U.S.A.	800
Cube Gambier	,,	Do.	Do.	25
Black Pepper	,,	Do.	Do.	170
Do.	,,	Penang	Do.	30
White Pepper	,,	Singapore	Do.	65
Do.	,,	Penang	Do.	...
Tapioca Pearl	,,	Singapore & Penang	Do.	290
Nutmegs	,,	Do.	Do.	25
Sago Flour	,,	Singapore	Do.	200
Pineapples	,,	Do.	Do.	cases 2,250
Do.	,,	Do.	Continent	3,750
Gambier	,,	Do.	South Continent	375
Do.	,,	Do.	North Continent	125
Cube Gambier	,,	Do.	Continent	40
Black Pepper	,,	Do.	South Continent	60
Do.	,,	Do.	North Do.	65
Do.	,,	Penang	South Do.	...
Do.	,,	Do.	North Do.	...
White Pepper	,,	Singapore	South Do.	30
Do.	,,	Do.	North Do.	65
Do.	,,	Penang	South Do.	...
Do.	,,	Do.	North Do.	...
Copra	,,	Singapore & Penang	Marseilles	50
Do.	,,	Do.	Odessa	...
Do.	,,	Do.	Other South Continent	700
Do.	,,	Do.	North Continent	760
Sago Flour	,,	Do.	Continent	725
Tapioca Flake	,,	Singapore & Penang	Do.	340
Tapioca Pearl	,,	Do.	Do.	65
Do. Flake	,,	Do.	U. S. A.	...

				Tons.
Gambier	Str	Singapore	U. S. A.	...
Cube Gambier	,,	Do.	Do.	...
T. Flake and Pearl	,,	Do.	Do.	...
Sago Flour	,,	Do.	Do.	...
Gambier	,,	Do.	S. Continent	...
Copra	,,	Do.	Marseilles	...
Black Pepper	,,	Do.	S. Continent	...
White Pepper	,,	Do.	Do.	...
Do.	,,	Do.	U. S. A.	...
Pineapples	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Black Pepper	,,	Do.	Do.	...
Do.	,,	Penang	Do.	...
White Pepper	,,	Do.	Do.	...
T. Flake and Pearl	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Copra	,,	Do.	Do.	100

1,500 tons Gambier } Contracts
1,025 ,, Black Pepper }

Export Telegram to Europe and America.

For Fortnight ending 31st January, 1906.

Wired at 3 p. m. on 1st February, 1906.

Tin	Str.	Singapore & Penang	to United Kingdom &/or	1,426
Do.	,,	Do.	U. S. A.	1,316
Do.	,,	Do.	Continent	175
Gambier	,,	Singapore	Glasgow	...
Do.	,,	Do.	London	...
Do.	,,	Do.	Liverpool	...
Do.	,,	Do.	U. K. &/or Continent	120
Cube Gambier	,,	Do.	United Kingdom	30
Black Pepper	,,	Do.	Do.	25
Do.	,,	Penang	Do.	...
White Pepper	,,	Singapore	Do.	55
Do.	,,	Penang	Do.	...
Pearl Sago	,,	Singapore	Do.	140
Sago Flour	,,	Do.	London	430
Do.	,,	Do.	Liverpool	...
Do.	,,	Do.	Glasgow	...
Tapioca Flake	,,	Singapore & Penang	United Kingdom	55
T. Pearl & Bullets	,,	Do.	Do.	140
Tapioca Flour	,,	Penang	Do.	150
Gutta Percha	,,	Singapore	Do.	45
Buffalo Hides	,,	Do.	Do.	35
Pineapples	,,	Do.	Do.	cases 8,000
Gambier	,,	Do.	U. S. A.	850
Cube Gambier	,,	Do.	Do.	40
Black Pepper	,,	Do.	Do.	310
Do.	,,	Penang	Do.	...
White Pepper	,,	Singapore	Do.	45
Do.	,,	Penang	Do.	...
Tapioca Pearl	,,	Singapore & Penang	Do.	50
Nutmegs	,,	Do.	Do.	12
Sago Flour	,,	Singapore	Do.	175
Pineapples	,,	Do.	Do.	cases 1,250

				Tons.
Pineapples	Str.	Singapore	Continent	1,000
Gambier	,,	Do.	S. Continent	175
Do.	,,	Do.	N. Continent	150
Cube Gambier	,,	Do.	Continent	25
Black Pepper	,,	Do.	S. Continent	200
Do.	,,	Do.	N. Continent	120
Do.	,,	Penang	S. Continent	10
Do.	,,	Do.	N. Continent	...
White Pepper	,,	Singapore	S. Continent	25
Do.	,,	Do.	N. Continent	80
Do.	,,	Penang	S. Continent	...
Do.	,,	Do.	N. Continent	...
Copra	,,	Singapore & Penang	Marseilles	...
Do.	,,	Do.	Odessa	150
Do.	,,	Do.	Other S. Continent	340
Do.	,,	Do.	N. Continent	480
Sago Flour	,,	Singapore	Continent	725
Tapioca Flake	,,	Singapore & Penang	Do.	140
Do. Pearl	,,	Do.	Do.	230
Do. Flake	,,	Do.	U. S. A.	20
Gambier	,,	Do.	Do.	...
Cube Gambier	,,	Do.	Do.	...
T. Flake & Pearl	,,	Do.	Do.	...
Sago Flour	,,	Do.	Do.	...
Gambier	,,	Do.	S. Continent	...
Copra	,,	Do.	Marseilles	...
Black Pepper	,,	Do.	S. Continent	...
White Pepper	,,	Do.	Do.	...
Do.	,,	Do.	U. S. A.	...
Pineapples	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Black Pepper	,,	Do.	Do.	...
Do.	,,	Penang	Do.	...
White Pepper	,,	Do.	Do.	...
T. Flake & Pearl	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Copra	,,	Singapore	England	...

400 tons Gambier } Contracts.
650 ,, Black Pepper }

Singapore.

Abstract of Meteorological Readings for the month of January, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	Ins.	°F	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory	29·937	144·7	79·7	87·3	73·9	13·4	77·2	·885	75·4	84	N.E.	16·16	3·05
Botanic Gardens	...	...	...	...	...	...	...	...	...	...		10·67	2·71

A. B. LEICESTER,
Meteorological Observer.

J. LEASK,
for Principal Civil Medical Officer, S. S.

Kandang Kerbau Hospital Observatory,

SINGAPORE, 14*th February*, 1906.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of January, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29·897	145·8	80·2	88·8	74·0	14·8	75·2	·674	70·51	71	North	7·50	1·78

COLONIAL SURGEON'S OFFICE,
PENANG, 16*th February,* 1906.

M. E. SCRIVEN,
Assistant Surgeon.

S. LUCY,
Acting Colonial Surgeon, Penang.

Malacca.

Abstract of Meteorological Readings for the month of December, 1905.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	%	%		Ins.	Ins.
Durian Daun Hospital ...	29·806	154·5	79·9	87·5	74·7	12·9	79·5	980	72·2	89	N.E.	7·39	2·75

F. B. CROUCHER,
Colonial Surgeon, Malacca.

Colonial Surgeon's Office,

MALACCA, 31*st January,* 1906.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of January, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping ...	...	156	80·31	93	70	23	76·84	878	...	85	...	23·46	5·42
Kuala Kangsar ...	...	...	79·91	92	69	23	75·92	843	...	82	...	16·01	3·84
Batu Gajah ...	...	160	80·09	92	70	22	75·67	831	...	81	...	13·29	2·56
Gopeng ...	...	...	79·37	92	67	25	75·62	838	...	83	...	13·14	3·82
Ipoh ...	...	...	80·10	92	72	20	77·03	889	...	87	...	10·01	1·38
Kampar ...	...	...	...	...	68	...	...	...	...	...	..	14·46	2·80
Teluk Anson ...	...	...	80·47	91	70	21	77·03	884	...	86	...	14·90	4·98
Tapah ...	...	...	80·17	94	68	26	76·38	860	...	84	...	15·42	2·56
Parit Buntar ...	...	...	80·89	91	70	21	75·91	829	...	78	...	4·82	1·76
Bagan Serai ...	...	...	80·75	91	70	21	76·46	855	...	81	...	11·67	2·70
Selama ...	...	...	80·67	91	70	21	76·80	872	...	84	...	16·72	2·50

STATE SURGEON'S OFFICE,
TAIPING, 20*th February*, 1906.

M. J. WRIGHT,
State Surgeon.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of January, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·880	151·0	81·1	90·2	71·5	18·7	76·7	0·837	73·8	77	Calm.	3·41	0·70
Pudoh Gaol Hospital ,, ...	...	...	...	...	...	...	...	...	...	...	...	5·22	0·95
District Hospital ,, ...	...	...	...	...	...	...	...	...	...	...	...	2·61	0·51
,, Klang	...	...	...	87·7	70·0	17·6	...	...	...	...	...	9·41	1·75
,, Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	12·49	2·50
,, Kajang	...	...	...	91·2	72·0	19·2	...	...	...	...	...	5·30	1·68
,, Kuala Selangor	...	...	...	...	...	...	...	...	...	...	...	8·11	1·93
,, Kuala Kubu	...	...	...	90·1	71·0	19·1	...	...	...	...	...	5·73	2·07
,, Serendah	...	...	...	90·6	70.0	20·6	...	...	...	...	...	7·88	2·88
,, Rawang	...	...	...	90·8	67·4	23·4	...	...	...	...	...	8·56	1·42
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	9·04	1·50
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	...	11·50	1.60

STATE SURGEON'S OFFICE,

KUALA LUMPUR, 16*th February*, 1906.

A. J. McCLOSKY,

State Surgeon, Selangor.

The Duff Development Company, Limited, Kelantan.

Abstract of Meteorological Readings for the month of December, 1905.

DISTRICT.	Temperature.			Total Rainfall.	Greatest Rainfall during 24 hours.
	Maximum.	Minimum.	Range.		
	Mean. °F	Mean. °F	Mean. °F	Inches.	Inches.
Kuala Lebir ..	87·6	70·1	17·5	13·04	5·10
Ulu Liang ...	84·2	70·2	14·0	10·97	2·44
Serasa ...	91·1	70·1	20·0	10·31	1·35
Kuala Kelantan ...	81·5	73·7	7·7	22·00	5·10

SURGEON'S OFFICE,
15*th January*, 1906.

JOHN D. GIMLETTE,
Surgeon.

The Duff Development Company, Limited, Kelantan.

Abstract of Meteorological Readings for the month of January, 1906.

DISTRICT.	Temperature.			Rainfall.	
	Maximum.	Minimum.	Range.	Total Rainfall.	Greatest Rainfall during 24 hours.
	Mean. °F	Mean. °F	Mean. °F	Inches.	Inches.
Kuala Lebir ...	83·7	70·6	13·1	30·07	7·58
Ulu Liang ...	82·5	70·8	11·7	28·48	5·10
Kuala Kelantan ...	80·8	74·2	6·5	15·90	1·82
Serasa ...	90·2	70·2	20·0	26·82	3·51

SURGEON'S OFFICE,
6th February, 1906.

JOHN D. GIMLETTE,
Surgeon.

METEOROLOGICAL OBSERVATIONS.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the Month of December, 1905.

Date.	Temperature of radiation.						Temperature of radiation.				Wind.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Cloud and weather Initials.			Rain.
											Direction.																	
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference sun and shade.	Grass.	Difference shade and radiation.	9 H	15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	21 H	9 H	15 H	21 H	Inches.
	°	°	°	°	°	°	°	°	°	°			°	°	°	in.	in.	in.	°	°	°							
1	77	75	76	79	73	6	140	61	...	...	S.E.	S.E.	75·3	75·	75·5	0·877	0·868	0·872	94	100	97·	3	10	0	C	R	B	·41
2	78	87	82·5	88	72	16	145	57	...	...	S.E.	S.E.	74·6	75·5	75·	·857	·884	·870	89	69	79·	5	5	10	C	C	R	1·14
3	83	84	83·5	87	71	16	138	51	...	...	E.	S.E.	73·	75·7	74·3	·810	·888	·849	76	76	76·	0	0	0	B	B	B	·16
4	83	84	83·5	86	71	15	151	65	...	...	N.E.	S.E.	71·3	74·	72·6	·766	·840	·803	63	72	90·	0	8	0	B	O	B	·12
5	83	77	80	84	71	13	141	57	...	...	N.E.	S.E.	73·	73·6	73·3	·810	·829	·819	72	89	80·5	0	10	5	B	R	C	1·72
6	79	83	81	84	71	13	148	64	...	...	S.E.	S.E.	75·6	74·7	75·1	·888	·856	·872	90	76	83·	0	5	10	B	C	R	·22
7	81	87	84	89	71	18	153	64	...	...	E.	S.E.	74·	77·1	75·5	·849	·933	·891	80	73	76·5	0	0	10	B	B	R	1·02
8	82	89	84·5	91	74	17	152	61	...	...	E.	S.E.	73·6	72·7	73·1	·830	·801	·815	76	58	67·	0	0	0	B	B	B	
9	81	81	81	82	72	10	146	64	...	...	N.E.	S.E.	74·	76·	75·	·849	·897	·873	80	85	82·5	2	0	0	B	B	B	
10	83	80	81·5	85	72	13	146	61	...	...	S.E.	S.E.	74·7	75·	74·8	·856	·867	·861	76	85	80·5	0	5	0	B	C	B	·26
11	79	84	81·5	85	72	13	152	67	...	...	S.E.	S.E.	73·9	75·7	74·8	·839	·888	·863	85	76	80·5	0	2	0	B	B	B	·24
12	84	85	84·5	86	71	15	147	61	...	...	N.E.	S.	74·	70·1	72·	·840	·738	·789	72	61	66·5	0	0	5	B	B	C	·18
13	80	84	82	85	71	14	149	64	...	...	E.	S.E.	71·6	75·7	73·6	·775	·888	·831	75	76	75·5	0	0	0	B	B	B	·16
14	79	88	83·5	89	71	18	150	61	...	...	S.E.	S.E.	73·6	74·9	74·2	·829	·865	·847	89	65	77·	0	0	5	B	B	C	1·24
15	80	84	82	85	71	14	150	65	...	...	S.E.	E.	71·6	75·7	73·6	·775	·888	·831	75	76	75·5	0	0	0	B	B	B	·13
16	82	89	85·5	91	71	20	142	51	...	...	E.	E.	70·3	69·4	69·8	·742	·716	·729	68	52	60·	0	0	0	B	B	B	
17	79	92	85·5	94	70	24	150	56	...	...	E.	S.E.	70·6	71·	70·8	·749	·759	·754	75	50	62·5	0	0	0	B	B	B	
18	80	92	86	94	70	24	149	55	...	...	S.E.	E.	75·	72·6	73·8	·867	·802	·834	85	53	69·	0	0	0	B	B	B	
19	78	87	82·5	89	72	27	146	57	...	...	E.	E.	71·2	73·9	72·5	·765	·837	·801	79	65	72·	0	0	0	B	B	B	
20	82	87	84·5	88	72	16	140	52	...	...	E,	E.	70·6	75·5	73·	·749	·884	·816	58	69	63·5	0	0	0	B	B	B	
21	86	88	87	90	71	19	149	59	...	...	E,	S.E.	74·	74·9	74·4	·855	·865	·860	68	65	66·5	0	5	5	B	C	B	·52
22	83	85	84	86	71	15	145	59	...	...	E.	E.	71·3	73·4	72·3	·766	·826	·796	68	68	68·	0	5	5	B	C	C	·23
23	86	88	87	91	71	20	150	59	...	...	E.	S.E.	67·	74·9	70·9	·681	·865	·773	55	65	60·	0	0	2	B	B	B	
24	84	89	86·5	92	71	21	152	60	...	...	S.E.	S.E.	69·1	74·3	71·7	·710	·847	·778	60	61	60·5	0	0	0	B	B	B	·32
25	84	88	86	92	71	21	151	59	...	...	S.E.	S.E.	74·	74·9	74·4	·840	·865	·852	72	65	68·5	0	5	2	B	C	B	·73
26	79	83	81	84	71	13	151	67	...	...	S.E.	S.E.	75·6	74·7	75·1	·888	·856	·872	90	76	83·	0	5	2	B	C	B	·32
27	79	92	85·5	94	71	23	145	51	...	...	S.E.	E.	75·6	72·6	74·1	·888	·802	·845	90	53	71·5	0	0	2	B	B	B	
28	85	85	85	86	71	15	137	51	...	...	S.E.	S.E.	68·5	78.4	73·4	·698	·973	·835	58	80	69·	2	5	5	B	C	B	·41
29	83	88	85·5	90	71	19	145	55	...	...	S.E.	S.E	74·7	76·5	75·6	·856	·913	.834	76	69	72·5	2	10	5	B	R	C	1.42
30	82	91	86·5	92	72	20	145	53	...	...	E.	N.E.	73·6	76·4	75·	.830	·910	·870	76	62	69·	0	0	0	B	B	B	·11
31	83	90	86·5	92	72	20	147	55	...	...	E.	S.E.	73·	75·4	74·2	·810	·880	·845	72	62	69·	0	10	0	B	R	B	

Total 11·06

STATE SURGEON'S OFFICE,
SEREMBAN, *9th January*, 1906.

R. VAN GEYZEL,
Apothecary.

No. 2.] FEBRUARY, 1906. [VOL. V.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES

EDITED BY

H. N. RIDLEY, M.A., F.L.S., *Director of Gardens, S.S.*

AND

J. B. CARRUTHERS, F.L.S., *Director of Agriculture, F.M.S.*

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AGRICULTURAL BULLETIN

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FEDERATED MALAY STATES.

No. 2.] FEBRUARY, 1906. [Vol. v.

EAST INDIAN DRAGON'S BLOOD.

By H. N. Ridley.

Dragon's blood is a red resin obtained from the shells of the fruit of certain rattans belonging to the genus *Daemonorops*, natives of the Malay Peninsula, Sumatra and Borneo. The genus contains about 80 species, but only a few belonging to one section, *Pipto-spathœ*, produce this resin.

The resiniferous species are:—

D. didymophyllus Becc.	Malay Peninsula.
D. micracanthus Becc.	,,
D. propinquus Becc.	,,
D. Draco Bl. (*D. ruber* Mart).	Sumatra.
D. Draconcellus Becc.	Borneo.
D. mattaniensis Becc.	,,
D. motleyi Becc.	,,
D. sparsiflorus Becc.	,,
D. ruber Bl.	Java

Of these *D. micracanthus*, *D. propinquus*, *D. Draco* and *D. Draconcellus*, are all known to the Malays as Rotan Jerenang, and are the source of the greater part at least of the Dragon's blood of commerce. The remainder are probably also used, but we have no facts at present to go on to settle this point.

D. didymophyllus Becc.

Stem about 12 feet long, an inch thick, green covered with green or olive, large and small flat dagger-shaped spines, leaves 9 feet long, petile 8 inches long, flattened around with long needle-shaped spines, brown with yellow bases, leaflets about 20 in alternate pairs, oblong linear acuminate glabrous 6–12 inches long, one inch wide, spathes about 6, the lowest 7 inches long, with short flat irregular processes in lines, the upper ones with few or none of these processes. Spadix female, 8 inches or more long, with thick branches erect, peduncle flattened with slender acute spines on the edge, fruit oblong ½ inch long, short-beaked deep brown, scales a little broader than long, grooved, very resinous.

Common in forests, Singapore, Johor, Perak, Penang.

This rattan, known as Rotang hudang and R. Butong, is very abundant. Its fruits are very rich in Dragon's blood, but I do not know how far it is used for the resin, if at all, as it does not appear to be ever called Rotan Jerenang.

D. propinquus Becc. Fl. Brit. Ind. p. 467.

Stem stout. Leaves long, with rather distant leaflets 1 to 2 feet long, ½ to 1½ inch wide, linear lanceolate acuminate with bristles at the tip and on the nerves at the back. Male spadix very long cylindric, 18 inches with a broad flat thorny peduncle with irregular spines ½ inch long or less, the lower spathe broad boat-shaped and spiny, the next with few spines, and the remaining ones spineless. Spadix dense, over a foot long, branches slender. Female spadix long with stout branches. Fruit elliptic obtuse ¾-inch long, scales rather small convex channelled as long as broad, yellow, but usually covered with red resin.

Forests in Singapore, Malacca, Selangor, Kemaman, Penang, and Perak. Also Sumatra.

This plant closely resembles the original *Calamus Draco, (Daemonorops Draco)* if it is not identical.

D. micracanthus. Becc.

Stem when adult 30 or more feet in length and ¾ inch through, greyish green and hardly thorny, not at all so in young plants, but in adults dotted over with short transverse ridges obscurely ribbed. The leaves are about 4 feet long, the petiole armed with short small thorns, yellowish in color along the edges and with short transverse ridges scattered on the back passing into small yellow thorns above, the sheathing part of the petiole is gibbons. the leaflets are alternate narrowly linear about a foot long and half inch wide ending in a long narrow point. They are provided with a few small scattered bristles along the edge and keels. The inflorescences are short, about 6 inches long. The peduncle armed with short black-tipped thorns on a broad conic base. The sheaths are narrow with flat thorns in short transverse rows. The spadix in fruit has short stout branches with 5 or 6 fruits on each. The calyx-lobes orbicular, the petals lanceolate, obtuse, hard and ribbed. The fruit is globose or nearly so, terminated by the three short stigmas. The scales are in 6 or 8 rows with rounded backs grooved, about as long as broad, the tips rounded, and usually densely covered with red resin.

This plant is common in the Peninsula, occurring in Bukit Timah, in Singapore, Malacca, Johor, Negri Sembilan. It is met with in dense forest, but though very abundant it is quite rare to find fruits at least in the south, but it seems to be more abundant in Negri Sembilan whence Mr. MOORHOUSE sent me fruiting specimens, and it appears to supply the greater part of the Dragon's blood of the Malay Peninsula, excellent samples of which are often exhibited at our agricultural shows.

The young rattans are collected in many places, and in Johor are known as Rotan Tahi Ayam.

D. Draconcellus. Becc.

This is the species which Beccari says is the Rotan Jerenang of the Dyaks. His description of it (*Nelle Foreste di Borneo*, p. 608) is too meagre to identify it. He says it has a short peduncle to the spadix which is nodding, the leaf sheaths covered with almost bristle like black thorns in rows, soon falling off, lobes of the leaf linear equidistant numerous very narrow 7-9 mill. broad on the back, the three nerves are bristly and the fruit has an abundant resin. He obtained it on Matang. On the same mountain at the top I got a plant which the Dyaks said was the true Jerenang, which has a compact erect panicle, rather thick, 8 inches long with a stout peduncle furnished with black-tipped spines. The flower bracts are orbicular convolute pale colored the flowers female rather large, calyx lobes orbicular ribbed, petals lanceolate ribbed. Fruit globose yellow, scales rhomboid, a little longer than broad and grooved. It shows little resin, but the fruit is unripe. The leaves are light colored with linear leaflets shortly acuminate narrow and with very few bristles except at the tip. The rachis is smooth rather slender with short recurved black-tipped thorns at each pair of leaflets, the leaflets being almost opposite. This plant may be Beccari's *D. Dracconcellus*, but it does not altogether agree. Another specimen from Matang, (July) has broader leaflets, bristly on the nerves at the back, with oblong fruits nearly an inch long, the scales broader than long and deeply grooved. These fruit are ripe and have much resin. It is also known at Jerenang, and, I think, is the same plant as the one obtained there later (11,828).

D. Draco Bl. The Rotan Jernang of Sumatra much resembles *D. propinquus* of the Malay Peninsula. It differs apparently chiefly in the spines on the sheath being more needle-like and arranged in small tufts, not dagger-shaped and arranged in rows as in *D. propinquus*. It grows to a height of 60 feet, and is as thick at the base as the forearm and densely spiny. The leaves resemble than of *D. propinquus* but are less bristly. The fruit resembles that of *D. micracanthus*, but is rather more conical. This was described originally by Rumphins (*Herb. Amboinense* v. 114) as the source of Dragon's blood. He gives a long account of it, from specimens sent to him from Djambi and

Palembang in Sumatra. He, however, confused with it another species called by Blume *D. accedens* with broader leaflets and more ovoid fruit, the *D. ruber* of Blume a native of Java.

Dragon's blood is exported from Singapore and Batavia. A good deal of it comes from Sumatra and Borneo, chiefly it is said Banjermasin. It is exported in two forms: *Reed Dragon's blood* in the form of sticks of various lengths and ¾ to 1 inch in thickness, wrapped in leaves usually of the Licuala palm, Daun Palas and Lump Dragon's blood in blocks or irregular lumps. It is dark coloured outside of a deep reddish black, but small fragments of the resin are transparent and brilliant crimson. Specimens of good lump, and also of the powdered resin, have not rarely been exhibited at the agricultural exhibitions. There seems to be several forms known in the trade of different value according to their brightness of colour. In a paper by Dr. DOBBIE and Mr. G. G. HENDERSON published in the *Pharmaceutical Journal*, November 10th, 1813, an account of the chemistry of a number of samples of Dragon's blood is given. The samples fall into four classes. The first is brick red in colour, and dissolves readily in alcohol, ether and carbon bisulphide and benzine. This form comes from Singapore and Sumatra, and is the product of *Dæmonorops Draco* (and probably also of our species *D. propinquus*).

The second is of a beautiful carmine red and melts at a higher temperature, 100c., dissolves freely in alcohol, ether and chloroform, but does not dissolve in carbon bisulphide, or benzine. These samples came from the "Dutch East Indies and Pontianak. This is probably the product of *D. Draconcellus* Becc.

The third sample is not derived from the East Indies and is the produce of a Dracaena from Socotra. The fourth, a reddish brown colored resin, is a mixture and perhaps may also be not produced by the Daemonorops.

Dragon's blood is chiefly used for a coloring matter for varnish, and also for coloring plasters and tooth powders. The Dyaks use it for coloring their woodcarving, mats and other artistic works.

The process of preparing it is stated to be by pounding the husks of the Rattan fruit to powder and passing it through a sieve in order to separate the larger portions of the shells. The powder is then either treated in the sun, or steamed in a closed vessel till it is soft when it is pressed into blocks or moulded into sticks. It becomes quite hard and of a dark colour when thus made up. I have no information as to what methods are used by the Malays of the Peninsula for making up the product.

The following account of Dragon's blood was lately published by Mr. E. M. HOLMES in the *Pharmaceutical Journal*, and is here reprinted:—

"The botanical source of East Indian dragon's blood is usually given as *Daemonorops draco*, Mart. (*Calamus draco*, Wild.), and the method of manufacture is copied from one work to another. In 1878 a very beautiful specimen of dragon's blood of an almost carmine red colour was presented to the Museum of this Society by the Commissioner of the Court of the Netherland Indies at the Paris Exhibition, and in 1890 some information was contributed by Dr. M. TREUB, Director of the Buitenzorg Botanic Gardens in Java, on the source of the different kinds of dragon's blood, and was published in the *Pharmaceutical Journal* for 1890 (3) 21, 518-519. This information showed that at Pontianak, in West Sumatra, whence the beautiful bright red dragon's blood above-mentioned came, three different species of the dragon's blood plant are characterised by having fruits of different size. The smallest fruits yield the most beautiful and most valuable dragons' blood, which is called "*Djernang Mundai*." The tree yielding this kind is rare and the price of the resin high. The moderate sized fruits yield the kind sold in flat cakes of varying size, and this kind is known as "*Djernang Beroewang*." The largest fruits yield the dragon's blood sold in pipes, which is known as "*Djernang Koekoe*." At that time the botanical source of these fruits was unknown. In 1903, Dr. BECCARI, who botanised in Borneo and Sumatra, published in the *Records of the Botanical Survey of India*, Vol, II. No. 3,224, an enumeration of the species of *Calamus*, which includes a number of species of the genus *Daemonorops*, all of one section of which yield, in a greater or less degree, a red resin, which is exuded by the scales of their fruits when mature.

"These resin-yielding species belong to the Section *Piptospathae* of the genus *Daemonorops*, in which the outer spathe does not completely enclose the inner, the spadix is narrow and cylindrical, or elongate before flowering, and then more or less diffusely branched. In this section there are three groups, and the dragon's blood plants are found in the Group C, which is distinguished by having the outer spathes either both deciduous or the outer one along persistent, and more or less armed with short, stout spines, the leaf-sheaths being also armed with scattered or serrate spines, which are never confluent, into an annular or spinulose crest. As the species are discriminated rather by the character of the leaves and inflorescence than by the flowers, and the material in herbaria generally has either the one or the other, but rarely both on the same specimen, it is by no means easy to determine the species to which the fruits used for the preparation of dragon's blood belong.

" From Beccari's monograph it appears that *Daemonorops draco*, Blume, consists of two species, one which Beccari calls *D. propinquus*, the other being the *D. ruber* of Martius. These are found in Penang and Sumatra. The plant called *D. ruber* by Blume is a native of Java, and considered by Beccari to be identical with the *D. accedens* of Blume. From this it may be concluded that dragon's blood is produced by *Daemonorops propinquus* Becc. of Malaya, Penang, Sumatra, and *D. ruber*, Mart., of Java. Beccari also mentions another Borneo species named by him *D. Motleyii* (Motley, No. 1,103) having fruits with a broadly ovate base, and yielding a red resin abundantly. We thus have four species known certainly to yield commercial dragon's blood. There are also the following species which are mentioned by Beccari as having fruits which exude a red resin, although whether it is commercially obtained from them is not certain. There are *D. micracanthus*, Becc., a native of Malaya; *D. sparsiflorus*, Becc., of Borneo and Labuan; *D. mattaniensis* and *D. draconcellus*, Becc., natives of Borneo. It may, therefore, be concluded that Indian dragon's blood is the produce of several species, and that it differs in tint and quality according to the species from which it is derived. It must not be forgotton, however, that in Pontianak, and possibly elsewhere also, the resin is nearly always mixed with the milky juice of *Garcinia parvifolia*, Miq., in order to give it more weight (l. c. p. 519).

" During the present year I took advantage of the kind offer of Mr. C. T. Johnson, now resident at Penang, an ardent botanist and former student of the Society's school, to try to obtain specimens of the plants that yield the different kinds of dragon's blood and benzine. He kindly sent me some of the fruits from which dragon's blood is prepared, possibly the *Djernang Koekoe* of Java, but found that it was almost impossible for a European to penetrate much beyond the towns on the coast line of Sumatra without danger to life, owing to the ill-feeling that exists between the natives and Dutch, and that only travellers who have by a lengthy residence and medical skill become trusted by the natives, have any chance of exploring the interior. The fruits correspond in size and character with that of *D. Draco*, figured by Blume in " Rumphia," and are therefore probably those of *D. propinquus*, Becc. For the present, therefore, there is but little chance of adding to our knowledge of the botanical source of Sumatran products or drugs.

" The finest kinds of dragon's blood are usually wrapped in the leaves of *Licuala spinosa*, according to the Rumphius. The best sorts are made by rolling the fruits in a sack to loosen the resin in the form of thin scales or powder, which is sifted out, warmed, and made into flat strips."

E. M. HOLMES,

The Pharmaceutical Journal of G. Britain,

December 16th, 1905, p. 833."

Further investigations seem necessary to distinguish if possible the dragon's blood of *D. propinquus* and *D. micracanthus* our native species from the Sumatran and Bornean varieties.

There may too be other species in the Peninsula used for this product. At the last agricultural exhibition there were two forms of the product shown from Negri Sembilan, one in powder and one in lump. These seemed to be different in color though it is not so easy to compare the lump and powder in point of coloring. Furthermore, besides the fruits of *D. micracanthus* which were shown with one sample, there were oblong very dark-colored fruits in a long spray certainly belonging neither to *D. micracanthus* nor *D. propinquus*, nor *D. didymophyllus*. I was unfortunately unable to secure a specimen, and should be very glad if anyone residing in these districts could get specimens of the flowers, fruit, leaf and stem of this handsome species.

H. N. RIDLEY.

THE AGRICULTURAL EXHIBITION.

The Annual Joint Exhibition of the Colony and Federated Malay States, will be held in Singapore in August this year. Exhibits of the produce and art of the Peninsula from Singapore to the Isthmus of Kra will be received. Reductions in the price of fares and of the freight of exhibits are promise by the Straits Steamship Company and the Federated Malay States Railways and the Singapore-Kranji Railway. The show will be held on the Reclamation Ground opposite the Raffles Hotel in Singapore in the first fortnight of August. His Excellency Sir JOHN ANDERSON offers a cup for the best exhibit of agricultural produce as on previous occasions, and several other cups are promised as prizes. The exhibition promises to be as fine a one as that of last year.

An account of the first public meeting held in Singapore is appended.

THIRD JOINT ANNUAL AGRI-HORTICULTURAL SHOW OF 1906.

A General Public Meeting held in Council Chambers at 4-45 p.m. on January 18th, Hon. JOHN ANDERSON, presided.

A General Public Meeting was held at the Council Chambers at 4-45 p.m. to-day (January 18th, 1906) for the purpose of discussing an "Agri-Horticultural Show" to be held in Singapore this year. The Hon. JOHN ANDERSON, presided, and there were also present:—Rev. N. J. COUVREUR, Rev. G. GEX, Hon. E. L. BROCKMAN, Hon. TAN JIAK KIM, Messrs. W. G. ST. CLAIR, H. N. RIDLEY, A. KNIGHT, J. POLGLASE, KHORY, SYMONDS, TOMLINSON, TAN KHEAM HOCK, R. LITTLE, E. F. H. EDLIN, N. TROTTER, ST. V. B. DOWN, WEARE, and others.

The Hon. J. ANDERSON, Chairman, said that he was not present there that day owing to any special knowledge he possessed for promoting Agricultural Shows, but to the appeal and persuasive eloquence of Mr. H. N. RIDLEY. Prior to 1904, Agricultural Shows were held in the Colony in a sort of casual way, one in Malacca and one in the F.M.S. In 1902 Mr. CHARLES CURTIS, Superintendent of Gardens and Forests in Penang, made a suggestion to Government that a system of what might be termed the holding of *Federal Agricultural Shows* be adopted, one to take place in one part of the Federated Malay States and another in some part of the Settlement. That scheme was adopted by the Government, and in 1904 a Show was held at Kuala Lumpur and one in Penang in 1905. It came about that the purpose for which they had met that day was one in which they were associated with the Government of the Straits Settlements and Federated Malay States. It was hardly necessary to point out the advantages of having such a Show in the Colony.

The show is not promoted as an entertainment for the passing hour. It is promoted with a practical object, the foundation of which is education, having as its object the stimulating and promoting of production and industries. Some of the advantages and benefits that unquestionably grow out of Agriculture Shows are for instance:—

The opportunity that it gives producers of comparing products.

The encouragement of comparatively new products.

Bringing planters and traders into communication.

Giving planters new ideas and higher incentive and shows them what standards should be aimed at.

Shows people what can be grown on and got from the Malay Peninsula.

The opportunity of agriculturists to come into relationship with manufacturers.

Applying perhaps more particularly to the Federated Malay States, it is a means of knowledge to the traveller and others what can be done and produced in the Federated Malay States and the Colony.

Introduction of Native Industries to our population and the community.

Improvement of Stock.

Circulation of currency, and is always productive of some improved trade.

I will now briefly outline the proposed arrangements of the Show, the Patrons will be the same as hitherto, including H. E. The Governor and the Sultans of the Native States.

The Vice-Presidents would be the Resident Councillors of the Colony and British Residents of the Native States who will authorize local arrangements.

There is a Standing Committee which is official and appointed by Government. There will be a General Purposes Committee or Committee of Management with its own Chairman, and Sub-Committees, each with its own Hon. Secretary for the different divisions which include :—

(*a.*) Agricultural Produce.
(*b.*) Flowers, Fruits and Vegetables.
(*c.*) Stock and Dairy Produce.
(*d.*) Horses and Dogs.
(*e.*) Native Industries.
(*f.*) Manufactures and Implements.

Turning to the financial side, I may say that $2,000 is voted by the Legislative Council, and a similar sum will be received from the Native States, and taking the cost of the Penang Show as an instance, viz., $11,000, about the same sum would be required here. The balance of money required is therefore obtained by subscriptions, and I may say that at the last Penang Show, nearly $7,000 including value of 50 Cups was collected. The cup money presented by different donors in various classes and sections of the exhibition including Plants, Flowers, Fruits, Rice, Horses, Dogs, Stock, Native Work and others.

Continuing the Chairman said he had the authority of Mr. RIDLEY to say that the Penang Show last year was the largest and most successful of its kind ever known in the East, even including India. He did not see, if it was organised properly, why they should not have as successful a one in Singapore. Mr. RIDLEY had told him that fifty cups were given by the members of the community in Penang. The rush was so great to give cups that he, Mr. RIDLEY, was debarred from giving one which he had intended presenting. He thought that they could at least equal the sister and elder settlement. They had come there that day with their resolutions more or less cut and dry, but he wanted to make it clear to them that they were quite open to criticise the resolution and suggest any amendments they thought necessary. He proposed that this meeting resolves that in "Co-operation with the Government of the Colony and Government of the Federated Malay States and in fulfilment of the policy and scheme formulated by these Governments, an Agricultural Show be held in the Settlement of Singapore in August of the present year on three days of that month, dates to be fixed by the Committee."

Mr. EDLIN seconded, and the resolution was carried unanimously.

The Chairman then proposed that the following General Commitee be appointed :—

GENERAL COMMITTEE.

1. R. Little
2. W. Diepenheim
3. D. N. Lovell
4. R. Scott
5. J. R. Innes
6. Hon. J. O. Anthonisz
7. Father Couvreur
8. W. J. Napier
9. Dr. Glennie
10. Dr. Falshaw
11. Dr. Symonds
12. C. S. Crane
13. W. R. J. Hawtrey
14. C. Sugden
15. J. D. Saunders
16. Alex Gentle
17. A. H. Lemon
18. Dr. Dane
19. H. Marriott
20. E. F. H. Edlin
21. A. W. Bailey
22. Rev. H. C. Izard
23. R. T. Wilkinson
24. Hon. E. C. Hill
25. J. E. Benzie
26. W. F. Nutt
27. A. J. MacDonald
28. E. A. Stevens
29. H. Scott Russell
30. D. C. Wreford
31. A. de Koster
32. Count de Bondy
33. Leon Housset
34. Hon. E. L. Brockman
35. J. B. Young
36. Noel Trotter
37. Van de Stadt
38. A. Knight
39. Father Gex
40. Dr. Lim Boon Keng
41. Dr. Murray Robertson
42. D. T. Boyd
43. J. Denniston
44. E. A. Morphy
45. R. A. J. Bidwell
46. S. Tomlinson
47. Tan Kheam Hock
48. Yeow Ngan Pan
49. Rev. Dr. West
50. W. S. Wigley
51. Dr. Gibbs
52. M. E. Plumpton
53. D. K. Sommerville
54. E. Nathan
55. C. Muhlenbein
56. A. M. McNeil
57. C. Gansloser
58. J. A. Drysdale
59. F. H. Garr
60. H. P. Bagley
61. A. Morrison
62. G. P. Nicholson
63. E. Bramall
64. P. Cunliff
65. R. T. G. Fleming
66. Mr. Killiani

GENERAL PURPOSES COMMITTEE.

1. Hon. John Anderson (*Chair.*)
2. Colonel Alex. Murray
3. Dr. D. J. Galloway
4. Colonel Pennefather
5. W. C. Michell
6. H. Payne Gallwey
7. S. Gad
8. Tan Jiak Kim
9. Seah Liang Seah
10. Choa Kim Keat
11. Syed Mohamud Alsagoff
12. John Somerville
13. G. P. Owen
14. J. Polglase
15. Victor Flower
16. A. T. Bryant
17. St. V. B. Down
18. Datoh Mohamud Bin Mahabob
19. W. Nanson
20. W. D. Barnes
21. W. G. St. Clair
22. Justice Thornton
23. Hans Becker
24. Robert Derry

The Chairman remarked that they were all aware of the difficulty of getting anyone to do the onerous duties of Hon. Treasurer. He suggested that they should ask Mr. WILLIAM MACBEAN, who had experience in the duties of Hon. Treasurer, to take up the post.

Mr. ST. V. B. DOWN seconded, and it was carried.

Continuing the Chairman said that no better man than MR. RIDLEY could be found for the duties of General Secretary to the Show.

MR. KHORY had great pleasure in seconding this proposal, and it was carried unanimously.

The Chairman said Mr. RIDLEY had suggested that the last fortnight in August would be the most suitable for holding the Show. The fruit would be coming on satisfactorily then. Owing to the water front, the reclamation ground opposite Raffles School would be the most appropriate, but if it was found to be not large enough, perhaps that part of the Show containing the horses and animals could be held on a separate piece of ground, probably on part of the racecourse.

Continuing, he urged upon all present to do their best in raising subscriptions to enable the show to be a success and, at least, to equal the Penang one.

PRICE OF TIMBER IN 1867.

Mr. HOOPER has lately sent me the original plan and estimate of the building of the Director's House in the Botanic Gardens in 1867. The house was built for the Superintendent of the Agri-Horticultural Society, which eventually transferred its property to the Government and this was the origin of the Botanic Gardens. The whole building as it stands now cost no more than $2,400, while the cookhouse and stables together cost $250. The price of the timber quoted in the estimate is as follows :—

> Daru beams 22 feet long, 6 inches square, 90 cents each ; Tampenis beams 28 feet by 9 inches square, 7 dollars ; 22 feet by 9 inches square, 5 dollars ; 22 feet by 6 inches square, 2 dollars 6 cents ; Serayah timbers 16 feet long 3½ inch wide less than 23 cents each. The labour for erecting the building was 750 dollars, whitewashing and painting 20 dollars.

The Tampenis beams are still as good as the day they were put up, and hardly any if any at all of the Daru timber has gone. Such Tampenis beams as those employed in building this house are not now procurable. It is many years now since I have seen a Tampenis tree big enough to give the smallest of these beams. The tree which must have been common at that time is now pretty nearly exterminated. The cost of repairs to the woodwork of this house during its thirty-nine years of existence has been very trivial, and when it is compared with that of later built buildings in Singapore, notably one large public building in which the beams said to have been of Balau perished completely in five years, one can only deplore the want of wisdom in the early Governments of Singapore which encouraged the destruction of the forests of the Island, and either allowed the timber to be burnt on the ground for the cultivation of gambier, or let it be sold out of the country. Had the Tampenis, Kranji, true Balau and other hard wood timbers of Singapore been preserved for the use of Government buildings, the cost of repairs during the last fifty years would probably have been not a fiftieth of what it has been.

H. N. R.

BETIS OR MALAY BILIAN.

By H. N. Ridley.

I have received from Mr. Stephens, of the Forest Department in Kwala Lumpur, specimens of the leaves, seeds and timber of a tree, the wood of which is called Betis, or Bilian, and is of high class quality. This so called Bilian must not be confused with the well known Bilian of Borneo, *Eusideroxylon Schwageri* of the order *Laurineae.* The Betis belongs to the order *Sapotaceae.* The Malay plants of this order have been recently described by Sir George King in his materials for a flora of the Malay Peninsula, but I do not find among them any plant corresponding exactly to the Betis. The specimens received are not adequate to describe the plant fully, and it may be hoped that further specimens may be received with flowers and complete fruit.

Betis or Bilian of the Malay Peninsula. *Palaquium,* sp.

A tree of large size leaves crowded at the tips of the branches, oblanceolate entire, tip rounded or with a very short blunt point, base narrowed to the petiole, length three inches, breadth one inch, thinly coriaceous shining above pale beneath glabrous, nerves eight pairs alternate, reticulated nervules conspicuous, petiole 1 inch long covered as are the buds with a little red wool. Flowers and fruits not seen. Seed very large, 1½ inch long one inch across, ½ inch through, elliptic flattened base rounded tip sub-acute, light yellow-brown, shining hilum large and broad, half the width of the seed. Cotyledons large and fleshy, no albumen.

The most nearly allied species I have to this plant, is *Palaquium microphyllum,* King and Gamble, a native of Singapore, but the leaves are more obovate and smaller and the petiole more woolly. The seeds of this plant I have not seen, but in a collection of plants from Sumatra received from a native collector some years ago there are specimens (distributed by me under the number 11,335) of a very similar plant bearing unripe fruit. This fruit is globose, about as big as a cherry, and the unripe seed bears some resemblance to that of the Betis. The foliage of this Sumatran plant is larger than that of P. *microphylla* and more coriaceous than that of the Betis, the reticulations of the nerves being invisible.

The Sumatran plant is called Balam; and is described by the collector as a big tree about 90 to 100 feet tall. The fruits very sweet and eatable, seed used for oil. The timber is very strong and used for furniture by Chinese who cut it into planks. Seeds are produced once a year or once in two years and are sold in the markets at 3 dollars or 3.50 a picul. The tree grows very fast in flat ground.

Fruiting specimens of another closely allied plant was obtained also in Singapore at Kranji many years ago with very coriaceous leaves, almost obovate, when adult fewer nerves, but the same reticulations as in the Betis. The fruit unripe is red woolly, and the seed though much smaller being unripe resembles somewhat that of the Betis.

The timber specimen sent by Mr. STEPHENS has a sapwood 4 inches thick, light fawn colour hard and compact. The heart wood is dark brown, red brown in longitudinal section, rings irregular and not very distinct, rays, very fine and close, transverse bars as fine as the rays, very numerous and close, pores few and small. It is a very heavy and hard wood and undoubtedly a first class timber.

More information and additional specimens are requirəd to give a full account of this plant, which is evidently well worth the attention of foresters.

H. N. RIDLEY.

ANNUAL REVIEW OF INDIA RUBBER MARKET DURING 1905.

(By Messrs. S. FIGGIS & Co.)

PLANTATION RUBBER GROWN IN CEYLON AND MALAY STATES.

WE have reported upon this fine rubber, and urged its cultivation for many years, and are glad to know that the cultivation of the Para "Hevea Braziliensis" has rapidly extended. We estimate to-day about 45,000 acres planted and being planted in Ceylon, and 50,000 acres in Malay, and no doubt further rapid extension will go on as so many new companies are talked of. The preparation of the rubber generally has been excellent, and results most satisfactory. As the quantities increase, and need more labour and increased space "to cure it," new ways of preparing the rubber will be found. As a rule, we have found by our long and wide experience that the manufacturers prefer either large rolled sheet prepared on some Malay estates, or biscuits not too thin and of nice colour, such as frequently come from Ceylon, especially "Culloden." Pale clean crape in sheet seems also liked. Do not pack in paper.

We reported in our special issue of May 12th: "With the extension of plantations and larger crops it has become difficult to continue on some estates the preparation in biscuits, and new processes are being tried. We have seen small sample lots of thin sheets cut into narrow strips which look nice rubber, but being not known to manufacturers in this form there has not been so ready bidding for it. Some washed and pressed pale clean rolled 'crape' in sheet was sold to-day at 6*s.* 8*d.* to 6*s.* 8½*d.*, but the darker coloured lots only realised 6*s.* 1*d.* No doubt this preparation will save planters time and trouble in preparation of their rubber, but they may perhaps find that there is some extra loss in weight to them in the preparation."

The difference of 1*s.* per lb. in favour of plantation fine, as compared with fine Para (Brazil) obtained when the supply of the former was smaller, may not be maintained when supplies increase. The preparation of "scrap" has improved and prices accordingly, the value as we close being of fine biscuits or sheet 6*s.* 1d., scrap 5*s.* to 5*s.* 4*d.*, fine Para 5*s.* 5*d.*, negrohead (best) 4*s.* Shipments from Ceylon we estimate 70 tons as against 40 tons in 1904. From Malay 75 tons. Rambong brought high prices, 4*s.* 6*d.* to 5*s.* There is but little Ceara. Castilloa we have scarcely seen. The world's supply of all rubber in 1905 was 60,000 tons.

It must be taken into account that "planting" rubber goes on in Mexico, Nicaragua, other Central American States, and some in Brazil and Bolivia, besides India, Burmah, Borneo, and Java, and recently in Samoa and Pacific Isles. Plantations in the Congo region of the native rubbers are being rapidly extended. We repeat the suggestion that owners will plant from Para seed and produce hard clean rubber, for which there is an excellent and increasing demand. But as the Amazonas show no signs of reduction of crops (Brazil exports 36,000 tons), too much expectation of serious decrease in Brazil supply may prove unwise.

REVIEW OF PARA PRICES FOR 1905.

Early last January hard fine sold at 5*s.* 0½d., soft 4*s.* 10½*d.*, scrappy negrohead 3*s.* 9*d.*, Cameta 2*s.* 9½*d.*, Caucho ball 3*s.* 3½*d.* Prices soon advanced 2½*d.*, and again 2*d.* in February, and the highest price of fine hard was paid in March—fine hard 5*s.* 9*d.*, soft 5*s.* 7½*d.*, scrappy 4*s.* 3*d.*, Island 3*s.* 7¾*d.* By end of March prices declined 2*d.* but recovered in April, and in May 5*s.* 9*d.* was again obtained for fine hard (5*s.* 8½*d.* soft being scarce), but only 3*s.* 1*d.* for Island, against 4*s.* 1*d.* paid for scrappy, and 3*s.* 4*d.* to 3*s.* 6*d.* for ball. By middle July values declined 4*d.*—hard 5*s.* 4¾*d.*, soft 5*s.* 3¾*d.*, scrappy 3*s.* 9*d.*, Island 2*s.* 9½*d.*, ball 3*s.* 4½*d.* During August we advanced 2*d.*, and the sinking of *Cyril* early in September pushed up values to 5*s.* 8*d.* fine hard, 3*s.* 11*d.* scrappy, 2*s.* 11*d.* Island, and 3*s.* 9½*d.* ball. Values fell constantly from 5*s.* 6*d.* end September to 5*s.* 2¼*d.* for hard end October, ball 3*s.* 9*d.* to 3*s.* 6½*d.* forward. In beginning November large receipts caused a decline to 5*s.* 1¾*d.* hard, 5*s.* 1¼*d.* soft, 3*s.* 10¼*d.* scrappy, 2*s.* 11*d.* Island, but ball being very scarce and over-sold advanced to 3*s.* 9¼*d.* spot, large sales forward down to 3*s.* 6½*d.* During November and December we had a quiet market at 1*d.* over these values till the close, when short receipts caused buyers to pay up to 5*s.* 5½*d.* for fine hard, 5*s.* 4*d.* soft, 4*s.* 0¼*d.* scrappy negrohead, 3*s.* 3½*d.* Island, and 3*s.* 10½*d.* Caucho ball spot, closing easier.

PARA MONTHLY STATISTICS, 1905.

Shipments (*January to December*).

1905.	Receipts at Para. Para. Tons.	Receipts at Para. Peruvian. Tons.	Shipments to Europe. Tons.	Shipments to America. Tons.
January	3,770	820	1,950	1,285
February	3,360	960	1,715	3,230
March	3,840	1,160	2,200	2,660
April	1,360	770	1,565	940
May	1,540	680	1,760	665
June	1,020	450	1,115	635
July	1,210	240	1,005	325
August	1,240	60	820	430
September	1,960	240	1,220	1,170
October	3,330	250	1,970	1,560
November	2,690	200	1,840	820
December	3,000	270	1,460	1,540
(Shipping weight) ...	28,320	6,100	18,520	15,260
Against in 1904... ...	25,925	4,390	14,285	16,289
„ 1903... ...	27,020	4,050	15,990	15,095
„ 1902... ...	25,430	3,160	14,855	13,705
„ 1901... ...	26,020	4,030	14,705	15,570

Total Imports, etc., of all sorts of Rubber were:—

ENGLAND.

	IMPORTS. Tons.	DELIVERIES. Tons.	STOCK, DEC. 31ST. Tons.
1905	21,700	21,410	1,562
1904	19,883	20,035	1,272
1903	19,464	19,626	1,424
1902	16,932	18,113	1,586
1901	17,936	17,793	2,767

Tropical Life, January, 1906.

RUBBER IN SOUTHERN INDIA.

By H. N. Ridley.

The account of rubber planting in Southern India in the Administration Report of Madras, 1904 to 1905, just received, is not a very encouraging one. Twenty-two trees of Landolphia Florida are said to be doing well, though somewhat damaged by monkeys. Of Ceara rubber a single plant at Kistna has produced 50 healthy seedlings, seed planted in South Canara, North Malabar, North Coimabatore, failed completely to germinate. There are however 2 acres at Kanoth and Manantoddy and a few full grown trees at other places. Some of these have been tapped but no results recorded.

Ficus Elastica apparently failed entirely, except a few plants protected from seed and sand blow.

Para rubber seed failed to germinate at Arcot, in North Malabar, 15 out of 535 germinated and five plants survive, in South Malabar of 535 seeds, 64 germinated and the rats, monkeys and porcupines ate all but 8 plants. There are 24 trees in good condition in one spot in South Malabar.

The small percentage of germination suggests that the seeds were a bad lot, or that there was something wrong with the planting, but anyway it is clear that Para rubber is not suited for the climate.

Kickxia Africana, 22 plants exist in South Malabar, but are poor in growth, and damaged by a boring caterpillar. It is a worthless plant anyway.

On the whole this part of India does not seem to offer a field to the rubber planter. Ceara seems the most likely plant to do in this region, but even that does not promise well. Obviously no time or money should be wasted over Para rubber.

COLONIAL FRUITS.

It is officially announced that three further exhibitions of Colonial Fruits and Vegetable Produce will be held by the Council of the Royal Horticultural Society, Vincent Square, Westminster London, on March 22nd and 23rd, June 6th and 7th, and December 4th and 5th, 1906 Full particulars may be obtained by intending exhibitors from the Secretary to the Society.

It will be remembered that a collection of Fruits preserved from Penang received a Silver Medal last year at one of these Exhibitions, and it may be hoped that again those who have the opportunity of sending samples of fruit, fresh or preserved, or of vegetables suitable for the trade of the European markets may take steps to prepare specimens for exhibition in London.

The Director of Gardens will be pleased to forward any samples sent to him in time for one of these exhibitions.—Ed.

CORRESPONDENCE.

CEARA RUBBER IN INDIA.

MYSORE PROVINCE, SHIMOGA,
1st *February*, 1906.

DEAR MR. RIDLEY,

I AM afraid that attention in Mysore must be confined to the "Ceara" variety rather than "Para," and in order to determine the question of yield, I am carrying out an extensive series of tapping operations in different parts of the Province.

I told you, I think, that 7 lb. were obtained from the continuous tapping of one tree in the Government Garden at Bangalore; and that 10 lbs. are reported to have been obtained from a tree in Coorg; also that I obtained 8 oz. of dry rubber from one tapping from a tree in my own compound.

I have also recently heard of 20 oz. of latex from one tree at one tapping. Taking the same proportion of dry rubber to latex as in the case of "Para." viz., 33%, this would mean 7 oz., and corroborates the above yield from my own tree.

The unfortunate point is that, both in the case of the 7 lb. return, and in the case of other trees that I myself tapped, every one of them died under the operation. You would be doing me, and I may add a promising industry, a very valuable service if you would kindly give me your views as to why these trees die.

Do you think that tapping "Ceara" must necessarily kill the tree; and do you know of, or have you heard of, cases where "Ceara" trees have been tapped without damage.

In the cases I allude to, the method of tapping was by stabbing the tree close all over, thus necessarily wounded the cambium as well as the young wood. The awkward part of it is that similar action on a "Para" tree would not have injured it.

I think you told me that the outer rough bark on the Ceara can be stripped off during all seasons of the year without injury.

In my present experiments I propose to adopt the ordinary double-herring-bone system and to carefully avoid the cambium.

If you would kindly give me your views on the whole subject I would be very much obliged.

Is there any prospect of my seeing you over in these parts.

Yours sincerely,
H. F. STRICKLAND.

P.S.—I would be much obliged if you would kindly insert a query in your very valuable Bulletin asking information upon the above point.

GOW, WILSON & STANTON, LTD., INDIA RUBBER MARKET REPORT.

13, Rood Lane, London, E.C. *February 2nd, 1906.*

At to-day's auction, 155 packages of Ceylon and Straits Settlements Plantation grown rubber were offered, 148 of which were sold. The total weight amounted to 8½ tons, Ceylon and the Straits Settlements each contributing 4¼ tons.

There was a good demand for all kinds, fine Crape, Sheet and Biscuit changing hands at 6/2, and a few dull parcels of Biscuits and Sheet at 6/1¾. Fine Scrap sold from 5/- to 5/3, some lower quality selling down to 3/8.

The Highland Estate (Straits Settlements) was represented by a fine invoice of washed Sheet amounting to just over 1 ton, which realized 6/2.

In face of the large receipts from Para, to-day's rates point to there being a strong and increasing demand for all grades, and the tone of the market generally is satisfactory.

Average Price of Ceylon and Straits Settlements Plantation Rubber.

148 packages at 5/10¾ per lb., against 96 packages at 5/9¾ per lb., at last auction.

Ceylon.

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
Tallagalla	2 cases	Fine large darkish biscuits	6/2
do.	1 case	Fine palish scrap	5/2¼
Deviturai	2 cases	Good palish and darkish sheet	6/2
do.	1 case	Good scrap	5/2¾
Ballacadua	2 cases	Fine pale and darkish biscuits	6/2
Nikakotua	1 case	Good rough palish and darkish biscuits	6/1½
do.	2 cases	Good scrap	5/1
Langsland	3 cases	Fine palish biscuits	6/2
do.	3 cases	Fine darkish biscuits	6/1¾
do.	1 case	Fine palish scrap	5/2½
New Rasagalla	1 case	Fine palish scrap	5/2¾
do.	1 case	Good darkish scrap	4/6
Halwatura	3 cases	Good darkish cloudy biscuits	6/1¾
do.	1 case	Sticky biscuits	5/-
do.	4 cases	Fine darkish scrap	5/2¾
Glanrhos	3 cases	Fine palish and darkish biscuits	6/2
Clontarf	2 cases	Fine do. smaller	6/2
do.	1 case	Fine palish scrap	5/2½

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
F B	1 case	Fine pale biscuits	6/2
do.	3 cases	Fine pale scrap	5/3¼
do.	1 case	Darkish washed worm	5/-
do.	1 case	Darkish scrap	3/8
do.	2 cases	Fair darkish biscuits	5/8
Tudugalla	11 cases	Good palish hard biscuits	6/2
do.	6 cases	do.	6/1¾
do.	4 cases	Good palish hard scrap	5/2 to 5/2¾
do.	11 cases	Fine palish to darkish biscuits	6/2
do.	3 cases	Fine pale scrap	5/2½ to 5/2¾
do.	4 cases	Dark scrap	3/11 to 4/0½
Maddagedera	3 cases	Fine palish to darkish biscuits	6/2
do.	1 case	Fine palish scrap	5/2
do.	1 case	Good darkish scrap and rejected biscuits	5/1
Halgolle	1 case	Fine pale and dark biscuits	6/2
do.	1 case	Good palish scrap	5/1
Sirigalla	1 case	Fine pale biscuits, few dark	6/1¾
do.	1 bag	Good pale scrap	4/-

Straits Settlements.

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
L E MUAR Straits	3 cases	Fine scored sheet	6/2
do.	1 case	Fine dark pressed scrappy sheet	5/0½
B N A & B	1 case	Fine palish sheet	6/1¾
do.	1 case	Rejected sheet	5/-
do.	1 case	Fine palish scrap	5/1
B N E	1 case	Fine pale scrap	5/2¼
R R S	3 cases	Fine pale pressed sheet	6/2
S R S	4 cases	Pressed scrappy sheet	5/-
G M S B	6 cases	Fine palish amber sheet	6/2
do.	1 case	Fine palish scrap	5/3
L & P F M S	7 cases	Fine pale washed ribbon	6/2
do.	1 case	do. little darker	6/0¾
K Y S	2 cases	Fine pale sheet	5/10
do.	1 bag	Fine pale scrap	5/-
M	1 case	Fine large pale biscuits	6/2
do.	6 cases	do. darker	6/2
do.	1 case	Fine palish and dark pressed sheet and scrap	5/2¾

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
C M C S	3 cases	Fine amber sheet and biscuits	6/2 bid
W J C S	1 case	Darkish crape	Bought in
W F	1 case	Good palish sheet	6/2
do.	1 bag	Good sheet, whitish centres	Bought in
do.	1 bag	Darkish scrap	do.
Highland Estate	17 cases	Fine palish to darkish scored sheet	6/2

Assam and Rangoon.

These kinds were only represented by 12 packages, of which only a few inferior parcels changed hands from 2/5 to 2/6 per lb.

GOW, WILSON & STANTON, LTD., INDIA RUBBER MARKET REPORT.

13, Rood Lane, London, E.C. *February 16th*, 1906.

At to-day's auction, 276 packages of Ceylon and Straits Settlements Plantation grown rubber were offered, 238 of which were sold. The total weight amounted to 13¾ tons, Ceylon contributing about 4¼ tons and the Straits Settlements 9½ tons.

This was the largest auction of Plantation grown rubber that has yet been held, and included several very fine invoices weighing a ton and over. The largest sale previously being that held on the 10th November, 1905, which consisted of about 11½ tons.

There was good competition at about last rates, Fine sheet selling from 6/1½ to 6/2¼; Crape from 5/5 for dark to 6/1¼ for fine pale; Biscuits from 6/1¼ for dull up to 6/2 for fine; Scrap from 3/8 for dark dirty up to 5/4 for fine.

There was also some nice clean red and dark Rambong which sold readily from 4/6¼ up to 5/-.

The popularity of the sheet form was again evidenced by a fine parcel of five cases from the Highlands Estate bringing 6/2¼ per lb., the highest price in the auction. Another fine parcel of very large sheet from Bukit Rajah sold at 6/2.

Average Price of Ceylon and Straits Settlements Plantation Rubber.

238 packages at 5/11¼ per lb., against 148 packages at 5/10¾ per lb. at last auction.

Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
Wiharagama	2 cases	Good pale biscuits	6/1½
do.	1 case	Good rough darkish biscuits	6/1¼
do.	1 case	Fair ball scrap	4/5
do.	1 case	Pale Ceara biscuits	6/1¼
T T C T	1 box	Good pale sheet and scrap	6/1½ and 5/-
Culloden	5 cases	Fine palish amber biscuits	6/2
do.	1 case	Good cuttings	5/2¾
do.	4 cases	Fine palish scrap	5/3¼
do.	1 case	Dark scrap	3/8
Nikakotua	2 cases	Fine palish biscuits	6/1¾
do.	1 case	Good dull darkish biscuits	6/1½
do.	2 cases	Darkish scrap	5/1¼

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
Arapolakande	9 cases	Fine dark biscuits	6/1¾
do.	3 cases	Fine dark scrap	4/11
Tallagalla	2 cases	Good large dark cloudy biscuits	6/1¾
do.	1 case	Good palish scrap	5/3
Dolahena	2 cases	Fine amber sheet	6/1¾
do.	2 cases	Fine dark sheet	6/1¾
do.	1 case	Good scrap and rejections	5/1
Baddegama	1 case	Fine palish scrap	5/2
Gikiyanakande	5 cases	Fine pale washed worm	Bought in
do.	2 cases	Fine palish rolled and pressed crape	do.
do.	3 cases	do. darkish to very dark	do.
do.	1 case	do. very dark	do.
D C	1 case	Good pale to dark cloudy biscuits	6/1¾
do.	1 case	Good ball scrap and pieces	Bought in
Aderdeen	9 cases	Fine small darkish biscuits	do.
do.	1 case	Thick scrappy sheet, whitish inside	5/0½
do.	3 cases	Fine palish scrap	5/3
do.	1 case	Darkish scrap	Bought in
Weoya —	8 cases	Fine small biscuits pale to dark	6/1¾
do.	1 case	do.	6/2
do.	1 case	Fine palish scrap	Bought in
Polatagama	7 cases	Fine small dark biscuits	6/1¾

Straits Settlements.

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB.
S K A	12 cases	Fine palish sheet	6/1¾ bid
S K B	1 case	Scrappy sheet	5/1¼
S K	1 case	Scrap and sheet	5/3
do.	1 case	do.	5/3
H & S B	1 case	Pressed scrap and sheet	5/1
F & Co.	1 case	Rambong sheet and scrap	5/-
P R S B	3 cases	Fine darkish sheet	6/1¾
do.	1 case	Darkish sheet and rejections	4/11½
G U L A	1 bag	Fine pale pressed sheet	6/1
K P & Co., Ld.	6 cases	Good large pale to dark biscuits	6/1½
do.	2 cases	Rejected do.	5/4¾
do.	1 case	Good palish scrap	5/4
do.	1 case	Fine pressed Rambong sheet and scrap	4/8½
V R Co. Ld. F M S	7 cases	Fine amber sheet	6/1½
do.	6 cases	Fine scored sheet	6/2
do.	6 cases	do.	6/1¾
do.	2 cases	Fine palish crape	6/1¼
do.	9 cases	Fine pale pressed crape	5/8¼
do.	6 cases	Fine dark do.	5/5

MARK.	QUANTITY.	DESCRIPTION.	PRICE PER LB-
S R L	6 cases	Good large darkish biscuits	6/1¾
do.	20 cases	Fine palish to darkish biscuits	6/1¾
D K P C L	2 cases	Good palish pressed sheet	5/7¼
B R R C	2 cases	Good scrappy sheet	5/7¼
Tiger Asahan	8 cases	Fine palish to darkish biscuits	6/1¾
do.	1 case	Good pressed Rambong scrap	4/6¼
do.	2 cases	Fine palish rolled scrap	5/-
do.	1 case	Darkish pressed Rambong scrap	5/-
do.	1 bag	Pale and darkish scrap	5/1
do.	1 case	Good rejections	5/1
do.	3 cases	Dark pressed Rambong scrap	4/11
Bukit Lintang	6 cases	Fine amber biscuits	6/1¾
B R R Co.	22 cases	Very fine large amber sheet	6/2
do.	4 cases	Darkish scrappy sheet	5/3½
do.	7 cases	Fine palish scrap	5/3½
do.	7 cases	Good darkish scrap	Bought in
do.	5 bags	Fine dark pressed scrap	4/7
do.	1 case	Fine Rambong scrap	4/7½
do.	1 bag	Fine pale sheet	Bought in
Highland	5 cases	Fine amber scored sheet	6/2¼
do.	3 cases	do.	6/2
do.	4 cases	Fine corrugated sheet	6/2 offered
do.	3 cases	Fine darkish crape	Bought in

SINGAPORE MARKET REPORT.

28th February 1906.

Articles.	Quantity Sold.	Highest Price.	Lowest Price.
	Tons.	$	$
Coffee—Palembang	...	22.50	22.50
Bali	14	20.50	20.50
Liberian	147	22.50	19.00
Copra	1,320	7.40	7.00
Gambier	731	7.70	7.55
Cube Gambier, Nos. 1 & 2	345	11.50	10.62½
Gutta Percha, 1st quality	...	300.00	150.00
Medium	...	200.00	90.00
Lower	...	80.00	12.00
Borneo Rubber, 1st, 2nd & 3rd	...	128.00	78.00
Gutta Jelotong	...	5.62½	5.35
Nutmegs, No. 110's	...	35.00	31.00
No. 80's	...	54.00	51.00
Mace, Banda	...	73.00	70.00
Amboyna	...	60.00	52.00
Pepper, Black	897	20.75	20.00
White (Sarawak)	203	30.12½	29.00
Pearl Sago, Small	325	4.50	4.35
Medium	35	5.00	5.00
Large	...	...	...
Sago Flour, No. 1	3,120	3.12½	2.82½
No. 2	10	1.00	.97½
Flake Tapioca, Small	340	10.00	9.50
Medium	50	...	...
Pearl Tapioca, Small	290	9.40	9.00
Medium	156	9.75	9.12½
Bullet	...	...	...
Tin	1,057	83.50	81.62½

Exports Telegram to Europe and America.

Fortnight ending 15th February, 1906.

		To.	Tons.
Tin	Str Singapore & Penang	U. Kingdom &/or	1526
Do	,, do	U. S. A.	610
Do	,, do	Continent	465
Gambier	,, Singapore	Glasgow	—
Do	,, do	London	25
Do	,, do	Liverpool	250
Do	,, do	U. K. &/or Continent	70
Cube Gambier	,, do	United Kingdom	40
Black Pepper	,, do	do	100
Do	,, Penang	do	30
White Pepper	,, Singapore	do	120
Do	,, Penang	do	—
Pearl Sago	,, Singapore	do	55
Sago Flour	,, do	London	200
Do	,, do	Liverpool	950
Do	,, do	Glasgow	275
Tapioca Flake	,, Singapore & Penang	United Kingdom	300
T. Prl. & Bull.	,, do	do	300
Tapioca Flour	,, Penang	do	450
Gutta Percha	,, Singapore	do	20
Buffalo Hides	,, do	do	65
Pineapples	,, do	do	23,000 cases
Gambier	,, do	U. S. A.	1300
Cube Gambier	,, do	do	140
Black Pepper	,, do	do	600
Do	,, Penang	do	40
White Pepper	,, Singapore	do	110
Do	,, Penang	do	30
Tapioca Pearl	,, Singapore & Penang	do	110
Nutmegs	,, do	do	13
Sago Flour	,, Singapore	do	750
Pineapples	,, do	do	1,250 cases
Do	,, do	Continent	2250
Gambier	,, do	South Continent	80
Do	,, do	North do	250
Cube Gambier	,, do	Continent	20
Black Pepper	,, do	South Continent	250
Do	,, do	North do	170
Do	,, Penang	South do	20
Do	,, do	North do	—
White Pepper	,, Singapore	South do	15
Do	,, do	North do	65
Do	,, Penang	South do	20
Do	,, do	North do	—
Copra	,, Singapore & Penang	Marseilles	—
Do	,, do	Odessa	—
Do	,, do	Other S. Continent	400
Do	,, do	North Continent	2350
Sago Flour	,, Singapore	Continent	320
Tapioca Flake	,, Singapore & Penang	do	290
Do Pearl	,, do	do	—
Do Flake	,, do	U. S. A.	75
Gambier	Slr do	do	—
Cube Gambier	,, do	do	—
T. Flake & Pearl	,, do	do	—
Sago flour	,, do	do	—
Gambier	,, do	South Continent	—
Copra	,, do	Marseilles	—
Black Pepper	,, do	South Continent	—
White Pepper	,, do	do	—
Do	,, do	U. S. A.	—
Pineapples	,, do	do	—
Nutmegs	,, do	do	—
Black Pepper	,, do	do	—
Do	,, Penang	do	—
White Pepper	,, do	do	—
T. Flake & Pearl	,, do	do	—
Nutmegs	,, do	do	—
Copra	,, Singapore	England	—
tons Gambier	Contracts		600
Black Pepper			[illegible]

Export Telegram to Europe and America.

Fortnight ending 28th February, 1906.

		To.	Tons.
Tin	Str Singapore & Penang	U. Kingdom &/or	1125
Do	,, do	U. S. A.	478
Do	,, do	Continent	195
Gambier	,, Singapore	Glasgow	—
Do	,, do	London	—
Do	,, do	Liverpool	—
Do	,, do	U. K. &/or Continent	95
Cube Gambier	,, do	United Kingdom	10
Black Pepper	,, do	do	—
Do	,, Penang	do	30
White Pepper	,, Singapore	do	25
Do	,, Penang	do	—
Pearl Sago	,, Singapore	do	55
Sago flour	,, do	London	150
Do	,, do	Liverpool	—
Do	,, do	Glasgow	—
Tapioca Flake	,, Singapore & Penang	United Kingdom	45
T. Prl. & Bull.	,, do	do	220
Tapioca Flour	,, Penang	do	575
Gutta Percha	,, Singapore	do	25
Buffalo Hides	,, do	do	25
Pineapples	,, do	do	8,000 cases
Gambier	,, do	U. S. A.	750
Cube Gambier	,, do	do	75
Black Pepper	,, do	do	80
Do	,, Penang	do	—
White Pepper	,, Singapore	do	20
Do	,, Penang	do	—
Tapioca Pearl	,, Singapore & Penang	do	330
Nutmegs	,, do	do	8
Sago flour	,, Singapore	do	150
Pineapples	,, do	do	3,000 cases
Do	,, do	Continent	300
Gambier	,, do	South Continent	125
Do	,, do	North do	—
Cube Gambier	,, do	Continent	10
Black Pepper	,, do	South Continent	125
Do	,, do	North do	10
Do	,, Penang	South do	—
Do	,, do	North do	—
White Pepper	,, Singapore	South do	—
Do	,, do	North do	10
Do	,, Penang	South do	—
Do	,, do	North do	10
Copra	,, Singapore & Penang	Marseilles	380
Do	,, do	Odessa	150
Do	,, do	Other S. Continent	100
Do	,, do	North Continent	—
Sago Flour	,, Singapore	Continent	—
Tapioca Flake	,, Singapore & Penang	do	35
Do Pearl	,, do	do	110
Do Flake	,, do	U. S. A.	—
Gambier	Slr do	do	—
Cube Gambier	,, do	do	—
T. Flake & Pearl	,, do	do	—
Sago Flour	,, do	do	—
Gambier	,, do	South Continent	—
Copra	,, do	Marseilles	—
Black Pepper	,, do	South Continent	—
White Pepper	,, do	do	—
Do	,, do	U. S. A.	—
Pineapples	,, do	do	—
Nutmegs	,, do	do	—
Black Pepper	,, do	do	—
Do	,, Penang	do	—
White Pepper	,, do	do	—
T. Flake & Pearl	,, do	do	—
Nutmegs	,, do	do	—
Copra	Str Singapore	England	—
tons Gambier	Contracts		150
Black Pepper			525

Kelantan.

Abstract of Meteorological Readings taken at the Duff Development Concession, Ltd., Kelantan, for the month of February, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
				Mean. °F	Mean. °F	Mean. °F						Ins.	Ins.
Kuala Lebir	...	...	...	91.4	71.5	20.3	...	...	...	...	...	.78	.46
Serasa	...	...	...	92.0	71.0	21.0	...	...	...	...	...	.86	.31
Ulu Liang	...	...	...	89.4	71.5	17.5	...	...	...	...	...	2.54	1.04
Kuala Kelantan ...	...	...	...	85.50	73.53	11.97	...	...	...	...	...	.00	.00

SURGEON'S OFFICE,
13th March, 1906.

JOHN D. GIMLETTE,
Surgeon.

Malacca.

Abstract of Meteorological Readings for January, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Durian Daun Hospital	29.846	152.9	79.5	89.8	69.9	19.8	81.3	1.053	63.2	93	N.E.	4.27	1.44

Colonial Surgeon's Office,
Malacca, 28*th January*, 1906.

F. B. CROUCHER,
Colonial Surgeon.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for February, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory ...	29.883	152.3	81.7	91.3	75.5	15.8	76.6	82.2	71.78	71	N.W.	3.54	1.12

G. LUCY,
Ag. Colonial Surgeon.

Colonial Surgeon's Office,
Penang, 9*th March*, 1906.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of February, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall in 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping ...	...	155	82.57	92	72	20	78.05	899	...	83	...	16.87	2.43
Kuala Kangsar...	...	...	81.72	95	72	23	76.79	854	...	78	...	7.01	2.70
Batu Gajah ...	...	161	81.86	93	71	22	77·21	873	...	81	...	6.92	3·18
Gopeng ...	...	...	80.96	94	63	31	76.59	859	...	81	...	9.25	2.47
Ipoh ...	...	...	82.20	93	74	19	78.41	922	...	84	...	6.96	.92
Kampar ...	...	...	...	...	70	...	...	...	...	...	...	15·36	3·75
Teluk Anson ...	...	...	82.16	93	69	24	77·95	904	...	83	...	8.06	1.45
Tapah ...	...	...	81.28	94	68	26	76.97	872	...	82	...	11.74	3·54
Parit Buntar ...	...	...	82.51	91	73	18	77·58	879	...	79	...	2.94	2.30
Bagan Serai ...	...	...	82.39	92	70	22	77·55	880	...	80	...	3·55	1.50
Selama ...	...	...	82.50	92	72	20	78.23	909	...	82	...	16.89	3·74

STATE SURGEON'S OFFICE,
10*th March*, 1906.

W. J. B. ASHBY,
State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of February, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29.881	152.4	80.1	90.9	71.5	19.4	76.1	0.828	73.6	80	Calm	6.99	1.26
Pudoh Gaol Hospital ,, ...	..	..	..	..	..	..	..	..	..	..	..	8.63	1.77
District Hospital ,, ...	..	..	..	..	..	..	..	..	..	..	..	8.40	2.12
,, Klang	..	..	..	88.5	70.2	18.3	..	..	..	..	..	5.01	1.23
,, Kuala Langat	..	..	..	..	..	..	..	..	..	..	..	3.78	1.06
,, Kajang	..	..	..	92.5	71.9	20.6	..	..	..	..	..	9.88	1.86
,, Kuala Selangor	..	..	..	..	..	..	..	..	..	..	..	4.01	0.68
,, Kuala Kubu	..	..	..	92.0	71.7	20.3	..	..	..	..	..	8.88	1.83
,, Serendah	..	..	..	91.2	69.5	21.7	..	..	..	..	..	11.97	2.96
,, Rawang	..	..	..	92.7	67.2	25.5	..	..	..	..	..	5.09	1.45
Beri-beri Hospital, Jeram	..	..	..	..	..	..	..	..	..	..	..	6.70	1.54
Sabah, Bernam	..	..	..	..	..	..	..	..	..	..	..	4.24	1.43

E. A. O. TRAVERS,
State Surgeon, Selangor

STATE SURGEON'S OFFICE,
KUALA LUMPUR, 12*th March*, 1906.

Singapore.

Abstract of Meteorological Readings for February, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	Ins.	°F	%		Ins.	Ins.
Kadang Kerbau Hospital Observatory ...	29.906	142.9	80.8	89.5	73.9	15.6	78.0	.879	75.9	78	N.E. E.N.E.	5.99	1.83

W. GILMORE ELLIS, *P.C.M. Officer*.

A. B. LEICESTER, *M.O.*

KADANG KERBAU HOSPITAL OBSERVATORY,
20*th March*, 1906.

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1906.

No. 3.] MARCH, 1906. [Vol. V.

AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

EDITED BY
H. N. RIDLEY, M. A., F. L. S.,
Director of Botanic Gardens, S. S.
AND
J. B. CARRUTHERS, F. L. S.,
Director of Agriculture, F. M. S.

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NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, &c. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valua-"tion regarding new or little known natural or manufactured pro-"ducts of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M.A., F.R.S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given.

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

AGRICULTURAL BULLETIN
OF THE
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NO. 3.] MARCH, 1906. [VOL. V.

THE TIMBERS AND GUTTAS OF THE MALAY PENINSULA.

(SAPOTACEÆ.)

The order of trees known as that of the *Sapotaceæ* is one of the most troublesome to the Botanist, as so many are trees of such gigantic size that it is extremely difficult to get flowers or fruit of them. The flowers are small and inconspicuous and it is often difficult to determine whether a tree is in flower or no, and if it is, it is frequently impossible to get specimens. At the same time it is an order of no small importance producing some of the finest hard timbers in the East and also being the source of gutta percha, and of many oil seeds. The plants of this order occurring in the Malay Peninsula have lately been described by Sir GEORGE KING and Mr. GAMBLE in the Materials for a Flora of the Malay Peninsula, No. 17, published in the *Journal of the Asiatic Society of Bengal,* (Vol. LXXIV 1905). Forty-eight species of indigenous trees belonging to seven genera are described, with the two cultivated species of *Mimusops*.

GUTTA PERCHA PRODUCING SPECIES.

Of the plants which produce the best gutta perchas, all belong to the genera *Payena* and *Palaquium*, the latter including the *Dichopsis* of other works. The true gutta percha tree is *Palaquium gutta*, Burck, from which *P. oblongifolium* is only distinguished as a variety. This is I think, quite a correct view, though Dr. BURCK who had studied these plants carefully decided that the two were quite distinct species. The plant undoubtedly varies a great deal in foliage, not only in different circumstances and surroundings but also at different ages. Dr. ROMBURGH who distinguished the two species declared that a plant in the Botanic Gardens which appears to have been one of the original types of *D. gutta* was *oblongifolia*. Having seen many thousands of plants in all ages and under all conditions, I have failed to find any distinguishing characters between the forms which are in any way reliable. The common name is Taban in the Malay Peninsula. In Sumatra it is called Balam, and several forms are distinguished under the names of Balam putih and Balam merah (typical *P. oblongifolium*) and Balam Belukar more resembling the round-leaved *D. gutta.* A quite worthless but beautiful tree which is very often mistaken at first sight for gutta percha is *Payena Maingayi.* Its conspicuous golden leaves usually much longer than those of the *Palaquium gutta* at first glance suggest those of that plant. Its gutta too when fresh drawn and set has the same red speckled appearance of first class gutta but never hardens, remaining a putty-like mass, which usually at least becomes quite black after a short time. It is very common in Malacca and open country generally in the Peninsula. It is known as "Malaim pata", and is said to give a good durable timber, heavy and dark brown, used in house building. It attains the height of about 70 feet. It is one of the numerous plants known also as Niatoh, a name applied to a large number of gutta-producing plants, and according to Mr. CURTIS the Malay call it "Taban Percha", the real gutta percha being always known here as Getah Taban, and not as Percha. The seeds are imported from Sumatra for oil.

Payena Selangorica, King and Gamble, is another tree which at first sight when alive resembles *Palaquium Gutta,* but the leaves are much stiffer. I found the only specimen yet known on the woods of Bukit Kutu in Selangor. It is a tree about 20 feet tall. I took it for a gutta tree and was surprised to find on cutting into it that no gutta came out at all.

Payena Leerii.—The white gutta percha, Getah Sundek occurs all over the Peninsula and in Sumatra, Banka, Borneo and Amboina, but an allied species *P. Havilandi,* King and Gamble seems to be commoner in the Peninsula. This latter, known here as S'marum, is a big tree like *Leerii,* but has rounder leaves. Its gutta appears as good as that of *P. Leerii.* At one time a good deal of Getah Sundek was collected in the Dindings. This was the produce of *P. Leerii.*

Payena lucida.—A common tree of no great size known as Niato, Niatoh putih, Niato bulam, Poko Tanjong hutan (from a resemblance to *Mimusops Elengi*) gives no gutta. The timber is poor and not large.

Palaquium obovatum, King.—The Taban putih is the well known *Dichopsis obovata,* Clarke. It gives a fairly good second class white gutta. It is also called Niato bunga, Niato tembaga, Niato balam (Balam and Niato are both Sumatran words signifying what is known as Taban here.) It is a very common tree and never seems to have been very popular with gutta collectors. *Dichopsis Krantziana,* Pierre, a native of Cochin-China seems to be very closely allied to this plant. Young plants grown in the Botanic Gardens are hardly distinguishable from *D. obovata. D. Krantziana* produces a gutta similar to that of *D. obovata,* which is exported from French Indo-China in the form of twists. It is of low value.

P. Maingayi, King and Gamble, is the Getah Taban Simpor, and I have it also under the name of Jelutong Batu, though of course, it has nothing to do with the real Jelutong. The leaves are in shape somewhat like *P. obovatum*, but instead of being grey beneath are covered with golden hair. The tree attains a height of 60 to 80 feet with a diameter of 3 to 4 feet. It occurs in Perak, Malacca and Jelebu.

P. Clarkeanum, King and Gamble, is closely allied to if not merely a variety of the last species but it is rather hairier. Mr. ARDEN who sent specimens from Selangor says that the Malays called it Getah Ketapang (doubtless from its resemblance to the Ketapang tree, *Terminalia Catappa*,) and find its latex useful for adulterating gutta percha.

P. oxleyanum, Pierre (*Dichopsis pustulata*, Hemsley), is known to the Malays of Perak as Taban Sutra, or Taban putih, and Mr. BURN-MURDOCH sends leaves from Kuala Lumpur of what is doubtless this plant, saying that the Malays there also calls it Getah putih and use it to mix with Getah Jelutong. WRAY also gives Getah Taban chaier (lit watery Gutta percha) as a name for it. Burck's *P. oxleyanum*, collected by TEYSMANN in Banda is a totally different plant.

P. xanthochymum, Pierre (*Dichopsis rubens* Clarke). A big tree with leaves which turn bright red when they dry, is said by DE VRIESE to give a yellowish gutta percha of second quality. The plant does not appear to be common though it grows in Singapore, Malacca and Perak. I have not heard of its gutta being utilized at all here.

P. bancanum, Burck. A gigantic tree of which there is a splendid example in the Botanic Gardens is said by KING and GAMBLE to give a kind of gutta percha. It certainly does contain a small quantity, but it appears to be very scanty. Mr. BURN-MURDOCH sends a few leaves of a plant known as *Niato* which appear to belong to this species.

P. Ridleyi, King and Gamble, Niato Hitam or Maiang is a big tree, 50 to 60 feet or more tall. The timber is said to be very flexible and durable but difficult to saw. It is heavy and is used in house building.

P. Herveyi, King and Gamble, the "Jungak" is a tree 40 to 50 feet tall, has an inferior light wood, not durable if exposed, and according to WRAY the gutta is sticky and worthless. It does not seem to be a very common tree.

P. stellatum, King and Gamble, only known from one collecting by SCORTECHINI in Perak is said by him to give good gutta but in small quantities.

Daru.—The timber known as *Daru* is not yet identified. According to Mr. CANTLEY quoted by Messrs. KING and GAMBLE it is produced by *Sideroxylon*.

This is I think, very doubtful. Trees shown to me as Daru in Sumatra were certainly not of this species. Probably more than one plant is the source of the timbers known as Daru in the trade. Most of it now I believe, comes from Sumatra.

H. N. R.

A FUNGUS ATTACKING ROOTS OF PARA RUBBER.

From two Estates I have received rubber stems attacked with a subterranean fungus which does not appear to be *Fomes semitostus*. The trees are all young about 2 inches through. The roots are all encrusted with a white mycelium and dead, and the collar of the tree is also dead. One planter from Borneo writes that "If left alone the trees are absolutely dead within three weeks of the first appearance of the disease. They rot at the roots and in the green wood. The inside of the stem becomes discoloured and the tree falls. From 70 to 80 of the trees have died. They were not growing in a batch but are scattered about amongst the healthy trees." The other planter sends somewhat similar information from Perak. The disease appears sporadically there also "The trees were growing" he writes "most luxuriantly on a new field, 8,000 of them, yet here and there wide apart about a dozen died." The trees are I gather about 16 months old.

It is impossible as yet to guess that fungus is the aggressor, as there are no sporophores yet. The stumps are put in a damp spot to see if the fungus will fruit. It is doubtless I think, one of the *Polyporeæ*. I have seen a very similar attack on Clove trees in Malacca. The trees appeared healthy but died suddenly, retaining their leaves. The death was attributed to Termites, but on digging up the trees the roots and up to the collar of the tree was found to be coated with Mycelium in the same way as the Para rubber trees are. Another fungus if not perhaps the same thing, was well known to serve Coffee bushes in the same way. This proved to be *Irpex flava*, a yellow Polyporus, which I have seen attacking other trees ground infested by this plant was considered unfit for planting on, and in the days of Coffee one often saw little spots of ground where it was said Coffee would not grow, and this was due to the Mycelium of the *Irpex*. It did not seem to spread however, and often occupied an area a few feet square only.

The Malays had a theory that this death of trees on special bits of ground, was due to a trunk of a poisonous tree lying buried beneath the ground, and in a sense they were not far wide of the mark. *Irpex* like all this class of fungi is naturally a *saprophyte* living on dead timber but under certain circumstances not very clear becomes parasitic attacking living wood, and it is probable that the roots of the trees infected reached a mass of under ground decomposed wood infected with *Irpex*. Probably something of this kind has gone on in these estates where the Rubber trees have been attacked. The Borneo Estate is quite a newly formed one and in Perak the fungus has appeared on a newly planted portion. In both cases the disease is sporadic, and does not appear to have spread to other trees just as was the case in *Irpex*. It must, however, be remembered that the trees attacked are young and have not spread that mass of roots interlacing with those of the next trees that we have in the big trees attacked by *Fomes*. In the case of coffee attacked by *Irpex* nothing was done, but to abandon the spot where the fungus had appeared, and probably with the decay of the food supply of the fungus, the fungus itself would die away.

Whatever be the fungus which has caused this destruction it will certainly be advisable to lime the soil well where the tree has died and to avoid planting any more rubber trees on this spot.

It might be a good thing also in cases like this to plant a Banana plant or two on the infected ground. These polypori cannot of course, grow on Bananas, and the plants help to break up the decomposed and infected wood and roots beneath the soil. This has been tried in the Botanic Gardens against *Fomes*. The ground infected was dug over, treated with lime and copper sulphate, and planted with Bananas, and the fungus in this patch seems to have quite disappeared. It is however the oldest bit of the infected area and the fungus may have died out of itself. This fungus whatever it is should be carefully watched, to see that it does not spread to the trees next to it.

H. N. R.

PARA RUBBER TAPPING IN JAVA.

In the *Journal d'Agriculture Tropicale*, January, 1906, p. 9, there is published an article by M. TROMP DE HAAS on tapping rubber in the Experimental Gardens at Tjikeumeuh in Java. He begins by pointing out how trees vary in the amount of latex they produce and how important it is to select seed from the most productive trees. This is I think, appreciated by all. It is the line on which cultivation in its true sense must take in this class of plants. Trees vary considerably in the amount of latex, and also in the amount of Caoutchouc they produce but this is not always due to the idiosyncracy of the tree. A tree occasionally produces but little at one time, and might be considered worthless or nearly so, but a few years later it produces for some occult reason quite as much as could be expected of it. A tree in the Botanic Gardens Singapore tapped many years ago refused give any milk at all, though a quite similar tree close by gave two pounds and a half. It was noticed in this tree that the bark seemed loose, as if so to say it was too big for the trunk. Some years afterwards on being tapped again it was found to be quite as good a milker as the other and has continued so ever since. Another tree on being tapped refused to give milk, till a Fiddlewood tree close by it was cut down when it gave plenty of latex. In this case, no doubt the Fiddlewood tree was taking too much water from the ground and not leaving enough for the Para tree. Accidental circumstances must be taken into account when a tree refuses to milk properly. It may not be the fault of the tree itself as much as the fault of the environment.

M. TROMP DE HAAS in speaking of a small tree which gave actually more latex than a big one, states that this tree which was the same age as the big one, was arrested in growth, and says that if the Heveas are cultivated properly we should be able to obtain only large trees. The Editor of the Journal writes in a foot note that it would be evidently preferable to have a large number of small trees than a small number of large ones. This is however not in accordance with the facts shewn in the last report of the Gardens on rubber tapping, the proportion of rubber per unit of bark and the weight of the rubber being greater in large than small trees.

The system of tapping adopted by M. TROMP DE HAAS, is different from any of the usual forms. A tree is marked out with 4 vertical grooves, and a row of cuts seven in number made at right angles to each groove, on one side only. At the second collecting period similar cuts are made on the other side of each vertical groove meeting those of the first tapping in a V shape. A cup is put under every alternate cut. The third tapping is made under the first set of cuts, the fourth under the second series. The first cuts are made with a gouge, and opened 10 to 15 times with a concave chisel. The cuts are made down to the wood. The cups used are conic in shape, and a little water is put in to prevent coagulation. The rest of the system is much the same as that in common use, except that the biscuits are dried at first with the aid of heat, and rolled with the now out of date rolling pin. The biscuits before exporting are rubbed with a little alcohol to remove any moisture.

Results are not given, but one would be inclined to think that the more modern systems of tapping would give a larger result.

The Author says in a note that he hears that in an estate at 500 metres altitude the latex will not coagulate with acetic acid and has to be smoked. This sounds remarkable but one would like more information on rubber at high altitudes.

He also states that unsmoked Para rubber does not vulcanize as easily as smoked wild rubber according to manufacturers, who, it appears, suggest that the plantation rubber should be smoked. Plantation rubber from old trees here has been perfectly vulcanized by Mr. BURGESS, I believe, without previous smoking.

It would be easy enough to smoke the rubber as indeed was first done by many rubber makers, but the smoked rubber fetched a slightly lower price than unsmoked. Smoking rubber was found to hasten drying and prevent the growth of mould and if it was preferred by manufacturers, it would be very satisfactory for planters who would save time and money by it.

H. N. R.

TO WHAT ALTITUDE CAN PARA RUBBER BE GROWN.

A planter in the *Madras Mail* writes "Our ideas as to the height at which it (Para rubber) can be grown have steadily enlarged. In South India I have given measurements of growth at 3,500 feet, and I may mention that I have plants 6 feet high from seed planted at stake among coffee, in 1904." Mr. WICKHAM saw in the Amazons trees growing at certainly over 4,000 feet, and all he saw being tapped were at over 2,000 feet above the sea. The general opinion however was that it does not pay to tap trees at over 3,000 feet. He suggests that this means that the trees would be smaller, and thus compared with the big trees lower down would not be considered worth tapping. However it is stated by some persons that at that altitude, the trees actually do not produce the latex required. Much more information is wanted in this subject.

If the Hevea grew in the hills of the Malay Peninsula at 4,700 feet anything like it does even in poor soil in the plains, it would be truly astonishing. At very little over 2,500 feet altitude the whole of our flora alters. At 4,000 we get a stunted class of trees small gnarled of slow growth, none of which can be successfully grown in the low country. But there is certainly a great difference in the growth of plants at high altitudes in different parts of the World. This depends to a certain extent on latitude, but also it may be noted that a flora changes less from the plains upwards if the high Hinterland is very extensive and very high.

The changes in the flora of the hills at even so low an altitude as 2,500 feet, as on Penang Hill, show that there is a distinct alteration in the growth and life of the plants from that of the lower slopes. Experiments on Heveas planted high up in the hills would be very interesting. Some trees were planted we believe, on Gunong Angsi at different heights and it would be worth trying at Gunong Hijau on the Perak hills.

Failures to grow here at such altitudes would not necessarily imply that Heveas would fail at similar altitudes everywhere, but the growth and yield of latex at such altitudes might throw some light on physiological problems of the plant. It is hardly likely that any plantations will be started at great altitudes here. The steep slopes of the hills, the comparatively inferior soil and the lower temperature would all be against the plant, besides which the greater part of the accessible hills are required for forestry and as water sources.

From South India we have had very bad reports of the growth of Para rubber, the planter quoted seems to have a higher opinion of its potentiality, though it must be said that the only measurement he gives, 6 feet in two years, is decidedly poor growth.

PARA RUBBER LEAF FUNGUS.

Mr. PETCH writes from Ceylon sending leaves of *Hevea Braziliensis* bearing a leaf fungus which he is about to describe under the name of *Helminthoporia Heveæ.* This appears identical with the leaf fungus described on several occasions in the Bulletin as attacking young leaves of Para rubber. It does not do much harm to adult trees, but is very troublesome occasionally in nurseries of young plants.

H. N. R.

CASSIA FISTULA.

This handsome yellow-flowered tree often known as the Indian Laburnum is sometimes cultivated here and especially in Malacca for its beautiful blossoms. The fruit is a long cylindrical pod containing small flat seeds imbedded in a sweet, but purgative black pulp. The fruit is commonly known as Pudding pipe, and the pulp used as a purgative. To this use has been added another by the Chinese whose skill and patience in inventing adulterations for everything saleable is well known, as an adulterant for opium (chandu), and there have been numerous complaints of this adulteration. The sticky pulp somewhat resembles opium in appearance, but otherwise it has no other similarity and cannot in any way improve the flavour or action of the drug.

H. N. R.

A PARASITIC FUNGUS ON ROSES.

This year 1905, in the wet weather of December our rose bushes in tubs were attacked by a fungus which caused many branches to die and become black. The fruit of the fungus is very minute. It appears in great quantity on the dead boughs and consists of minute globular heads borne on stalks, all of a reddish pink colour. Cutting off the affected twigs and use of clubicide was tried effectually but probably Copper sulphate would be better in this case.

Specimens of this fungus sent to Kew were identified by Mr. GEORGE MASSEE as *Sphoerostilbe cinnabarina*, Tul. This plant belongs to the section *Hypocreaceæ*, which includes the pestilent genus *Nectria;* TUBEUF in his Diseases of Plants, gives the genus *Sphoerostilbe*, as saprophytic only, but this species certainly appears to be parasitic on the rose bushes.

H. N. R.

CRICKETS EATING RUBBER PLANTS.

The crickets described as biting off the tips of rubber seedlings by Dr. LIM BOON KENG, about which a note was published in the Bulletin of December, 1905, have been identified by Mr. C. O. WATERHOUSE of the British Museum. One of these is *Brachytrypes* *achatina*, a very common insect. In India it is accused of serving tea, jute and rice in the same way. This little dark brown cricket is extremely abundant in the Botanic Gardens among the grass beneath the rubber trees, but it does not attack the rubber seedlings there probably because there is lots of grass and other weeds for it to eat. It is the insect identified by Dr. HANITSCH as *Gryllacris tessellata*, (Bulletin 1905, p. 457), and is an insect I saw caught in abundance in Province Wellesley by a light over a pan of molasses. Another cricket sent by Dr. LIM BOON KENG proved to be a young specimen of *Gymmogryllus elegans*, about half grown. This is a blacker colored beast than the *Brachytrypes*. The adult says Mr. WATERHOUSE has bright yellow wings and is one of the handsomest crickets.

Dr. LIM BOON KENG says it behaves in just the same way as the *Brachytrypes*, biting off the tips of the seedlings and carrying them off to its burrows.

H. N. R.

The Bark Fungus of Para Rubber.

A specimen of this fungus described in the Bulletin for December, 1905, p. 457, has been identified by Mr. GEORGE MASSEE at Kew Gardens as *Corticium calceum*, Fr.

NOTES AND NEWS.

Mr. STANLEY ARDEN has resigned his post as Superintendent of the Experimental Gardens at Batu Tiga in Selangor, in order to take up the managership of the large Rubber estate being formed at Pulau Kukub in Johore.

A new publication of interest to those engaged in agriculture and commerce in the tropics has lately been received. It is the Quarterly Journal of the Institute of Commercial Research in the Tropics, of the Liverpool University. The object of the Institute is to collect and tabulate all kinds of information about raw products, trades, industries which can be of service to commerce the study of the Natural History of Tropical Countries especially in relation to commerce, investigating problems in connection with this, training experts in these branches of applied science, and supplying information to all interested in these subjects. Explorations, research work and publication of reports and monographs, form part of the work of the Institute which has enrolled the services of a large number of well known scientific men and experts to assist in its labours. A number of notes on specimens received, are published in the first number of the Journal. The dried juice of the Chiko (*Achras sapota*) it is suggested might be used in the manufacture of jam.

A paper on the cultivation of *Ficus elastica* is promised shortly. The Quince-scale, *Aspidiotus cydoniæ* is identified as a pest on *Castilloa elastica* in Nicaragua, and the boring longicorn beetle, *Taeniotes scalaris* var *suturalis* is also identified as a pest to the same tree.

Godown pests of various kinds are treated of, as are some of the inferior classes of rubber, chiefly African.

The Museum authorities ask for samples of produce of various kinds.

There can be no doubt that the Institute and its Journal will fill a want in collecting and distributing information on commercial subjects in this large port.

H. N. R.

REPORT ON THE

AGRI-HORTICULTURAL SHOW,

PENANG.

Held on the 9th, 10th and 11th August, 1905.

PRESIDENT:

Hon. J. K. Birch.

GENERAL PURPOSES COMMITTEE.

Bell, Elton.
Brown, J. R.
Janion, E. M.
Peel, W.
Pigott, F. J.
Swan, W. R.
Stitt, G. H.
Williams, W. H. Rev.
Wolferstan, L. E. P.

Chairman—A. H. Lemon.

Hony. Treasurer—E. M. Janion.

Hony. General Secretary—Walter Fox.

REPORT ON THE

PENANG AGRI-HORTICULTURAL SHOW 1905.

The Second Annual Agri-Horticultural Show held in Penang on the 9th, 10th, and 11th of August last and was opened by His Excellency The Governor. From every point of view it is admitted to have been in advance of any Show so far held. As will be seen from the Tables appended no Show hitherto held has been so widely represented, or so liberally supported, and speaking generally the standard of the exhibits were in advance of even the successful Show held at Kuala Lumpur last year.

2. The Prize Schedule was divided into five Divisions containing 341 Classes as follows:—

Division	(*A*)	Agricultural Produce ...	79	Classes
,,	(*B*)	Flowers, Fruits and Vegetables	114	,,
,,	(*C*)	Stock and Dairy Produce ...	44	,,
,,	(*D*)	Horses and Dogs ...	34	,,
,,	(*E*)	Native Industries and Manufactures	32	,,
,,	(*E*)	Section (1) Native Industries and Manufactures confined to Schools of the Colony and F. M. S. ...	13	,,
,,	(*F*)	Agricultural Implements and Miscellaneous ...	25	,,

3. Prizes were offered for the above amounting in the aggregate to $3,261 of which $2,374, was actually paid in cash and 22 Medals were awarded representing a value of $220. In addition to the liberal prizes 47 Silver Cups were offered for competition which included the Championship Cup presented by His Excellency The Governor.

4. The Show attracted 1,541 Exhibitors.

5. The following table shews the various places from which they came.

Penang and Province Wellesley ...	833
Perak	274
Malacca	203
Negri Sembilan	151
Selangor	43
Pahang	28
Kedah	5
Singapore	4

6. As regards the number of exhibits it is difficult to estimate them, but allowing however an average of 5 entries for each exhibitor, and 3 articles for each entry and deducting for those classes which did not fill there must have been over 20,000 exhibits.

7. The following table shews the number of Exhibitors in each Division, the places from which they came, and the prizes gained.

	Agricultural Produce.	Flowers, Fruits and Vegetables.	Stock and Dairy Produce.	Horses and Dogs.	Native Industries and Manufactures.	Agl: Implements and Miscellaneous.			
	A	B	C	D	E	F	Prizes.	Cups.	Medals.
Penang and Province Wellesley ...	244	168	132	44	204	46	$ 1,293	29	16
Perak	124	37	18	4	73	10	646	5	4
Malacca ...	79	33	...	...	71	20	233	...	...
Negri Sembilan ...	39	20	8	...	80	4	64	...	...
Selangor ...	16	10	6	6	5	...	113	4	2
Pahang ...	9	3	...	...	13	3	...	...	...
Kedah ...	...	...	...	3	...	2	15	...	...
Singapore ...	1	3	...	1	...	.	10	...	...
TOTAL ...	512	274	164	58	446	85	$2,374		

8. It will thus be seen that, as was to be expected Penang and Province Wellesley head the List with 54% of the number of exhibitors and took about the same percentage of Prizes. Enormous crowds of natives thronged the Show on each of the three days. This was no doubt due to the liberality of the Committee, who, recognizing the educative influence of these Shows, decided to issue free exhibitors tickets, which in the majority of cases admitted their families and friends. Notwithstanding this over 2,500 cheap tickets were sold at the gate. The question of housing and practically feeding this large influx of natives, was no light one, and would have been a serious one indeed had the Committee not had the advantage of the use of the Immigration Depôt where they were lodged free of charge, and fed for a nominal sum which was afterwards refunded to them in the shape of subsistence money.

9. The thanks of the Committee are due to the Government of

the F. M. S. who were good enough to carry exhibitors and their exhibits free over their railways; and to the Straits Steam-ship Company for a rebate of 25% off the freight of exhibits sent by their Steamers. This generosity relieved the Committee of a burden they could not well have borne, and contributed to the success of the Show to a very large extent; as it may be taken for granted that had not free transport been forthcoming very few natives indeed from a distance, would have incurred the necessary expense of visiting, or sending exhibits to the Show. The Government of the Colony were equally generous as regards the very large contingent from Malacca, by granting them the use of the Colonial Steamer "*Sea Belle*" to bring them and take them back. They were under the charge of their own Resident Councillor who took the greatest pains in looking after their welfare, and spared no trouble in impressing them with the object of these Shows. This remark applies with equal force to all the District Officers who accompanied the Exhibitors from their respective Districts. As is well known the success or failure of a Show lies to a very great extent with the District Officers, and nothing should be wanting to encourage them to still further effort in their endeavours to teach the natives the object and the lessons to be learned from these annnal competitive gatherings.

10. Turning to the financial side it will be seen that the Government of the Colony and the Federated Malay State contributed as last year $2,000 each. There was also an available balance from the last Agricultural Show which was held in Penang amounting to $503.02; and a small balance of $176.48 handed over from the Committee of the Kuala Kumpur Show. This last sum was given as a contribution towards the cost of sinking a die for a medal, and engraving a plate for Diplomas. Other subscriptions including a donation of $1,000 from Municipal Funds amounted to a sum of $5,976 which with the exception of $145 was collected entirely in Penang and Province Wellesley. This does not include special contributions in the form of cups, etc. to the value of about $1,500. With such interest as this liberal support evinced, it is not to be surprised the Show was such a pronounced success, and the Committee take the present opportunity of expressing their appreciation and thanks for this splendid support.

11. *Buildings.*—The Buildings necessary for such a large number of exhibits covered a floor area of 45,427 square feet, which at a cost of 5½ cents per square foot came to $2,498.48 and the internal fittings such as staging, etc. came to $979.91 or a total of $3,478.39. A sum of $277.70 must be deducted from the above, recovered for space let to the various exhibitors in the trade section, who were charged 5 cents per square foot of the area they occupied. The sheds 13 in number were of the following dimensions. Three large sheds 150′ × 50′ each, were arranged in the form of three sides of a square and accommodated Division *A*. Agricultural Produce Division *B*. Flowers, Fruits and Vegetables and Division *E*. Native Manufactures and Industries. The space provided large as it is

was, was barely sufficient for Division *A*. and *E*. The rest of the Divisions had ample space except perhaps the section for Poultry; which owing to late entries was somewhat crowded. For information the following table shews the sizes of the sheds for each Division.—

(*A*) 150′ × 50′
(*B*) 150′ × 50′
(*C*) Pig shed 150′ × 50′ cattle shed 100′ × 15′ Buffaloes 50′ × 20′ Sheep and Goats 100′ × 15′ Poultry 60′ × 6′ and 30′ × 20′
(*D*) Horses 2 of 100′ × 30′, Dogs 50′ × 20′
(*E*) 150′ × 50′
(*F*) 80′ × 50′

12. Other sheds were also erected for exhibiting pot making, sarong weaving, hat making, etc., also for Ladies' Cloak Room, Secretary's Office and Refreshment Bars. It may be remarked that this is a very large sum for each Show to stand annually; it is difficult however to see how it can be avoided as there are no permanent buildings suitable. As regards cheapness the Deputy Colonial Engineer who kindly supervised the erection, called for tenders, seven were sent in and the lowest was accepted.

13. *Nature and quality of the Exhibits.*—As has been already remarked the standard of excellence of the various exhibits was uniformly good and in many cases far excelled that of previous exhibitions. Taking the Divisions in their order it will be instructive to note the chief points of interest in each. Division *A*, Agricultural Produce. This Division was in charge of Mr. J. R. BROWN as Hony. Secretary. It had appropriately the largest number of Exhibitors in it, *viz.* 512 and here was seen the keenest competition among the staple products of Agriculture such as Padi, Coconuts, Rubber, Coffee, Sugar, Tapioca, etc. Acting on a recommendation of the standing Committee passed at the last Agricultural Show that substantial prizes should be given to the best collection of Padi, the Committee offered three prizes of $50, $25 and $10 respectively for the best collection of varieties "Grown in any one Mukim which had to be accompanied by an affidavit furnished by the Penghulu that the whole was grown in his own Mukim during the previous Padi season." The result was highly successful, as no less than seventy-three Exhibitors entered and the first prize going appropriately to the centre of the rice growing district, Krian; the second prize to the adjoining district of Nibong Tebal, whilst the third went to Matang, Perak. The Judges on this occasion were assisted by a Malay expert, and the admittedly difficult task of judging Padi was satisfactorily performed. The other classes for Padi and Pulot, were equally well contested. This keen competition must produce the most satisfactory result as time goes on by stirring the natives to adopt better methods of cultivation. Coco-nuts were again a prominent feature of the Show, no less than 152 Exhibitors sending in their names in the various classes for collections husked, and unhusked. The nuts were very happily described by the Governor

in his speech when opening the Show as simply "vast" and there can be no doubt, but that this important industry will be benefitted and fostered by these annual competitions.

14. *Rubber.*—It is almost unnecessary to say that round the exhibits of this marvellously successful product the greatest interest centered. It may be at once said that the collection of samples of Rubber staged, whether from the point of view of quantity, or quality, or variety of preparation was far in advance of anything that has been seen probably any where up to the present. Perhaps the most striking feature noticeable was the improvement in the methods of preparation, due to the lessons taught at the last Show by the practical demonstrations given by Mr. BURGESS the Government Analyst. Before that date uncertainty as to the best method to adopt was prevalent, but now although possibly the last word has not yet been said, an enormous advance towards that very desirable end, *viz.* a uniformity in the method of preparation has been achieved.

15. In more or less degree all the other 81 Classes except six were well filled and keenly contested. The classes which did not fill were Cocoa, Yellow Mace, Boiled Rice, Rum, Rumshrub, and Pearl Sago.

16. *Division B.—Flowers, Fruits and Vegetables.* The Rev. W. H. WILLIAMS was in charge as Hony. Secretary of this Division; and had his energies taxed in dealing with the large and varied quantities of fruit, which was the leading feature of this Division. Two-hundred and eighty-two Exhibitors entered for the three sections, of which by far the greatest number were for fruit. And it may be remarked that this was not a good fruit year. Good as the fruits was, it must be admitted that there is vast room for improvement in the way of good cultivation which it may reasonably be expected that with other means now being organized and the help of these annual Shows, will soon manifest itself.

17. *Division C.—Stock and Dairy Produce.*—Under the charge of Mr. ELTON BELL, M.R.C.V.S. brought out 164 Exhibitors. The three leading feature of this Division were the poultry, pigs, and Dairy produce. The number of birds of all sorts sent in was quite remarkable, and although there was nothing to compare with the splendid light Brahma fowls exhibited at the Kuala Lumpur Show, the birds were good. It is hoped that this section will be taken up more as it deserves to be. Some enormous pigs were shewn, Exhibitors being stimulated no doubt by the very handsome silver cups offered for competition. The samples of butter were very creditable, and show what can be done in this direction out here. The classes for cattle were only moderately represented and call for no special remark.

18. *Division D.—Horses and Dogs.*—This popular Division was in charge of Mr. G. H. STITT, although shorn of a part of its interest by the unavoidable cancelling of the classes for Dogs owing to the prevalence of rabies, it was very successful. There were 161 entries

in the 19 classes, competition being keen in nearly all of them.

19. *Division E.*—This the second largest Division, was in charge by Mr. W. PEEL with Mr. A. CAVENDISH as Asst. Hony. Secretary for the section devoted to Schools only. Probably to the majority of visitors this Division is the most popular, containing as it does the most unique articles of Native industry, many precious heirlooms in the shape of gold and silver ware, krisses, etc. Four hundred and forty-six Exhibitors sent in their names and so great was the number of Exhibits that the large shed 150′ × 50′ was filled to overflowing and the energies of the Hony. Secretaries were taxed to arrange them in a manner to be seen to the best advantage. Mr. PEEL suggests that at future Shows better arrangements should be made for hanging, and draping the innumerable Mats and articles of embroidery, that require that method of arrangement. He also notes that the silver ware was very old, pointing to the conclusion that ltttle is made now. The tin ware from Seremban was excellent, and sold with the greatest rapidity, indeed it was with difficulty that people were prevented from denuding the Show on the first day. It will be necessary to devise a better system of sale at future Shows, by booking orders, etc. The exhibits of Baskets (Rambong) from Malacca, were good and plentiful, and sold without any difficulty. This industry is capable of being improved and should be fostered. Section 1, Competition in this section was confined to the Schools of the Colony and Federated Malay States in all some 150 Schools competed chiefly from Perak. The produce was obviously made to sell, and it would seen desirable that more attention should be paid to quality.

20. *Division F.—Agricultural Implements and Miscellaneous*—Mr. W. R. SWAN was Hony. Secretary of this Division. Speaking generally it failed to come up to the expectation formed of it. Many classes did not fill and there was a want of competition in some of those that did, markedly in the classes for carriages, one exhibitor being the only Competitor; although in justice it must be said his exhibits were of excellent merit The trade section was undoubtedly a great attraction. The leading firms of Penang and Singapore vied with each other in the number and interest of their wares; and with the other Exhibitors in this section made up a Show of never failing interest, from the nature of their exhibits, which ranged from Precious Stones, and Medicines, to Motorcars, Bicycles, Carriages and Billiards Tables, etc.

21. The shed devoted to the exhibition of handicrafts such as pot making, sarong weaving, etc. was a source of never failing interest, so much so that, it was difficult to get a good view of the operators owing to the crowds thronging the shed. This section might with advantage be encouraged and extended. Endeavours were made to get a practical demonstration of horse-shoeing, but no one could be induced to give one. Whilst every care should be taken to encourage the native artizans to produce their own art, and not try to debase it by imitating cheap western ideas; steps should also be taken to provide standard patterns for them to work up to,

and familiarize them with improved tools, and implements of Agriculture.

22. *Judging.*—Twenty-two Judges were appointed, and the Committee desire to tender them their best thanks. They got through their work with commendable promptitude, and their decisions gave general satisfaction. It should be noted for the guidance of future Shows that it would be well to duplicate the judges for Division *A* and *E* respectively, and to help them by dividing the Divisions into one or more sections; rather than attempting any system of classification except perhaps in Division *E* the classes in which might be usefully increased. This would give the Judges more time for their onerous duties.

23. *Labelling of Exhibits.*—The system adopted of insisting upon each exhibit being properly labelled before arrival worked well, and as it becomes better known will be even more successful. By this system only can entries be accepted up to two or three days before the Show. It is obviously impossible at the last moment to receive and classify some 20,000 exhibits if not previously entered and labelled.

24. In connection with the staging of exhibits such as Rice, Padi, Etc., Mr. BROWN suggests the futnre Committees should require that samples should be put up in some uniform kind vessel, it matters little whether it be a wide mouthed bottle, or a box, or neat basket if they are of uniform pattern; every conceivable kind of vessel was used on the last occasion, which added to the difficul ties of judging, to say nothing of appearance.

25. *Standing Committee.*—The Standing Committee met on the second day of the Show. They decided that the Show be held in Singapore next year. Their attention was also engaged in the revision of the Rules and Regulations which required amendment. The principles which should be considered in granting Diplomas, and a number of other matters were also dealt with.

26. *Medals and Diplomas.*—The Committee regret that it was impossible to present Medals and Diplomas when the cups were presented, owing to their non-arrival from home. They will, however, be sent in due course to the winners of them.

27. *Protection.*—The protection of the exhibition was in the hands of the Police by day, and the F. M. S. Guides by night, and the fact that only three articles of trifling value were lost, testifies to the care and excellence of their arrangements. In conclusion the Committee take the opportunity of thanking all those Ladies and Gentlemen, who in their various capacities worked with such energy and good will, and without whose willing assistance, the Show would not have been the great success it was by general consent said to be.

28. A statement of Receipts and Expenditure is attached.

For the Committee,
WALTER FOX,
Hony. Genl. Secretary.

Agri-Horticultural Show, Penang, 1905.—Statement of Accounts.

Receipts.

	$	c.
By S. S. Government Grant	2,000	00
,, F. M. S. Goverument Grant	2,000	00
,, Municipal Grant	1,000	00
,, Balance from last Show, Penang	503	02
,, Received from Kuala Lumpur Show	176	48
,, Subscriptions	4,976	00
,, Subscriptions for Silver Cups	860	00
,, Gate Mone	622	20
,, Charges for Space (Trade Section)	277	70
,, Interest, (to 30th June, 1905) per Bank account ...	27	72
	$12,443	12

We have examined the Vouchers and other documents connected with this account and find it correct.

DAVID BROWN & CO.,
Auditors.

PENANG, 20*th October*, 1905.

Expenditure.

	$	c.	$	c.
To Erection of Show Buildings			3,478	39
,, Amount of Prizes			2,374	00
,, Cost of 50 Medals, and 250 Diplomas			1,404	15
,, Cost of Silver Cups, and engraving			1,010	75
,, Printing, Advertisements and Stationery			821	07
,, Transport and Subsistence money			1,217	52
,, Penang Band			137	00
,, General Charges			1,143	64
			11,586	52
,, Balance per Bank account	851	88		
,, ,, ,, (No. 2 account) ...	176	48		
	1,028	36		
,, Cheques drawn, not yet presented ...	171	76		
,, Balance			856	60
			$12,443	12

E. M. JANION,
Hon. Treasurer.

CORRESPONDENCE.

PARA RUBBER.

THE EDITOR,
THE AGRICULTURAL BULLETIN,
SINGAPORE.

Sir,—I have read with much interest, tempered with regret, Mr. BURGESS' "Report on a visit to Great Britain to investigate the India Rubber industry in its relation to the growth and preparation of raw India Rubber in the Malay Peninsula" published in the December Bulletin.

My regret was occasioned by the perusal of paragraphs 11 and 12 "Quality of plantation rubber."

Like Mr. BURGESS, I was in England last June "investigating the rubber industry in relation to" etc. etc., and though not supported by such distinguished introductions, met a good many people interested in the industry. Amongst them, I am glad to say, I did not find that there was any uniformity of opinion unfavourable to the quality of our rubber. As late as last August, the Managing Director of a manufacturing firm, whose name is a household word in the rubber world, speaking of a few small lots of rubber they had bought from this estate, said that they had not discovered any inferiority up to that time. If there *is* any inferiority, he added, it remains to be found in the lasting proportion of the manufactured article.

The late Dr. WEBER has been described as "the greatest Rubber Chemist" the world has ever known; and one would like to learn a little more than Mr. BURGESS tells us about the Silvertown test, before discrediting the reports of such an authority. A general statement that test had proved the inferiority of plantation rubber in *tensile* strength is somewhat discounted when one considers the nature of the evidence which Mr. BURGESS find sufficient to condemn its keeping quotation.

I submit that the lasting proportion of manufactured rubber cannot be ascertained by keeping sample of the crude product in air-tight jars. Such a test can have with practical value unless it is proposed to use rubber in a crude form or unless there are any planters who may desire to store their rubber for a few years.

Even as a test of the keeping qualities of crude rubbers, it would be necessary to know that chemicals detrimental to the rubber itself had not been used in its preparation.

I believe that in 1902 and 1903 the use of certain acid to assist coagulation was general but I have before me as I write, a slab of rubber—three quarters of an inch in thickness—which has not been in contact with chemicals.

I collected it on Gapis Estate, Perak, in July, 1902. I have cut it open and though still moist inside it is just as strong and certainly smells sweeter than it did 3½ years ago. It has not been preserved in an air-tight jar but has been used as a paper-weight.

CYRIL E. S. BAXENDALE,
Jugra Estate,
SELANGOR.

AGRICULTURAL EXHIBITION.

The date fixed for the Agricultural Show at Singapore is Thursday, Friday and Saturday, August 16, 17, 18. All particulars can be obtained from the Hony. Secretary.

H. N. RIDLEY.

ROYAL HORTICULTURAL SOCIETY.

VINCENT SQUARE, WESTMINSTER, W. S.
February, 6th 1906.

SIR,—I write to draw your special attention to the Shows of Colonial Fruits and Vegetable Products which this Society has now initiated in its New Exhibition Hall, and I would invite your co-operation with us in making this Show known among growers, shippers and others likely to be interested, and who might possibly make exhibits of the cultivated products grown within the regions you are able to influence.

The Shows this year (1906) will be held on March 22—24, June 6 and 7, December 4 and 5.

The first of these dates (March 22—24) has been specially fixed in compliance with the wishes of growers in South Africa and India; the second (June 6 and 7) is intended to suit Australia, Tasmania and New Zealand; and at the Show on December 4 and 5, we hope to get over the fruits of British Columbia, of other parts of Canada and of the West Indies, in the greatest possible perfection.

These Shows have been undertaken by the Society with a view to making known in Great Britain how well the Colonies can supply our home requirements of a horticultural nature beyond what we can produce in Great Britain.

No entrance fee or charge for space is made, and tabling is also provided free of expense. If desired, any produce may be consigned direct to the Society, and it will be stored in our cellars, and staged by the Society's officials, but we cannot undertake to repack and return any exhibits. Medals and other Prizes are offered by the Council for collective groups of fruits, vegetables, and flowers; for apples, pears, melons, grapes, citrus fruits, nuts, vegetables, preserves (whether bottled, tinned or dried), and for any other cultivated products of a like nature.

Each exhibit is judged on its individual merits, and medals and other prizes awarded at the discretion of the Council. The Press are specially encouraged to direct attention to, and themselves to visit, these Shows. The British Public quite fail to realise as yet what our Colonies can send us, and the Society thus offers an opportunity for the Colonies to co-operate with them in removing this ignorance, and, by bringing the Colonial Fruits before the home buyer, to show how the Empire could be made self-supporting.

The Shows will, I believe, be repeated in 1907, *provided* the interest evinced in those of 1906 is sufficient to justify their repetition. Otherwise they will be abandoned for a time, as poor Shows of our Colonial produce give entirely erroneous notions of the Empire's greatness, resources and wealth, and it would obviously be better to have no such Show than a poor one.

Hoping to have the benefit of your assistance in this important object.

I am, etc.

W. WILKS,
Secretary.

SUGGESTIONS FOR PACKING PLANTATION RUBBER.

Preparation for Packing.—The Rubber must be quite free from moisture, as the slightest trace might alter its appearance during transit. All heated Rubber must be kept separate, otherwise the bulk will be spoilt.

Keep the Rubber away from dust when drying. A strong light is harmful. The use of paper in packing should be avoided.

Form of Rubber.—Sheet form is now most liked. Sheets from 2 ft. to 3 ft. long and from 1 ft. to 2 ft. wide make a convenient size. They should be as uniform as possible, so that they can be neatly packed in cases each of an equal size and shape. Sheet Rubber packs closer than other sorts and therefore effects a small saving in freight.

Biscuits are also much appreciated. They should be of a uniform size, say 12 in. in diameter.

Crape is liked if very pale in colour, otherwise some buyers have a slight prejudice.

Scrap should be carefully collected and graded in two or, when necessary, three qualities.

Colour.—All fine qualities must be clear. For Sheet and Biscuits a rich amber colour is most desired; some of the rather darker shades are now selling quite as well as the very pale ones.

Cases.—Should be *strong* and well hooped, and capable of holding at least 1½ cwt. of Rubber, so as to minimise—

(i.) Draft allowances.
(ii.) The loss occasioned by the method of weighment.
(iii.) Freight.

Draft Allowance.—Packages weighing gross 28 lbs. or under carry no draft allowance, over 28 lbs. gross one pound draft is allowed, but if the *tare* is over 28 lbs., two pounds have to be allowed.

Weighing.—The method of weighing for sale purposes is as follows:—The case is weighed gross to the pound, no account being taken of odd ounces, thus 197 lbs. 12 ozs. would be called 197 lbs. The tare is then taken, but any odd ounces count as a full pound, thus 26 lbs. 4 ozs is taken as 27 lbs. It will be seen that the turn of the scale in both cases is given in favour of the buyer. This loss may be in a measure obviated by careful packing.

The net is never taken on the scale, but is arrived at by subtracting the tare from the gross.

Example showing only slight loss.

Gross Weight	197¼ lbs.	Taken as	197 lbs.
Tare -	26¾ ,,	,, ,,	27 ,,
Actual weight of Rubber	170½ ,,	,, ,,	170 lbs.

Example showing heavy loss.

Gross Weight	197¾ lbs.	Taken as	197 lbs.
Tare -	26¼ ,,	,, ,,	27 ,,
Actual weight of Rubber	171½ ,,	,, ,	170 lbs.

Thus it will be seen that it is to the advantage of producers that the *gross* weight should be only a few ounces *over* the pound and the *tare* (nails, hoops, etc., included) a few ounces *under* the pound.

Note.—In endeavouring to obtain the best results on weighment, Managers should always make an allowance of say a few ounces for loss by evaporation during transit.

Marking.—It is better that Sheets or Biscuits should be marked with the full name of the estate or the initials of the producing company. The cases should be similarly marked.

GOW, WILSON & STANTON, LIMITED,
Rubber Brokers,
13, Rood Lane, C.E.

March, 1906.

13, Rood Lane, London, E.C.
March 2nd, 1906.

At to-day's auction, 155 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which all but 12 were sold. The total weight amounted to 7½ tons, Ceylon contributing nearly 6 tons and Straits 1½ tons.

There was a good demand for all grades at about last rates, fine sheet and biscuits selling readily up to 6/2 per lb., which price was only paid for a few exceptionally fine lots; ordinary fine quality sold from 6/- to 6/1¾. The latter price was also realised for a parcel of fine pale washed ribbon, some darker qualities of which sold from 5/3¾ to 6/-. Rejected biscuits and sheet realised from 5/3 to 6/-; fine scrap from 4/10 up to 5/3½, a few low sandy heated lots selling down to 3/3.

An invoice of nice clean red Rambong from Java sold from 4/- to 4/1½.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PTANTATION RUBBER.

139 packages at 5/10¼ per lb., against 238 packages at 5/11¼ per lb. at last auction. Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Tallagalla	3 cases fine dark biscuits 6/1¾.
Gammadua	1 case very tin pale biscuits, 6/1¾.
Densworth	3 cases fine small darkish biscuits, 6/1¾. 2 cases rejected fine small biscuits and scrap, 5/3 to 5/10½.
Gikiyanakande	1 case good dark rolled crape, bought in.
Waharaka	1 case fine biscuits, 6/1¾. 1 case fine pale scrap, 5/3½.
Doranakande	9 cases fine darkish biscuits, 6/1¾. 3 cases pale scrap, 5/3¼. 3 cases dark scrap and cuttings, 5/1½.
Elston	2 cases good biscuits, 6/1½. 2 cases fine scrap 5/3¼.
Rangbodde	1 case fine pale Ceara biscuits 6/1½.
Ballacadua	2 cases fine biscuits 6/1½. 1 case fine darkish biscuits 6/1. 3 cases good scrap, 5/3¼.
Warriapolla	5 cases fine palish to dark biscuits, 6/1¾. 1 case rejected biscuits, 6/-. 1 bag scrappy biscuits, 5/3.
Wiharegama	6 cases fine biscuits, 6/1½ to 6/1¾. 1 case good ball scrap 4/3½.
Culloden	10 cases very fine biscuits 6/2. 1 case fine cuttings 5/3½. 3 cases fine pale scrap 5/3½. 2 cases dark scrap, 3/3.
Ingoya	7 cases fine darkish biscuits 6/1¾. 2 cases fine pressed scrap 5/3¼. 1 case scrap and pieces 5/0¾. 1 bag rejected biscuits 6/-.
Ellakande	2 cases Fine biscuits 6/1¾. 2 cases fine palish scrap 5/3¼.
Heatherley	3 cases fine biscuits, 6/1¾. 1 case fine sheet 6/1¾. 3 cases fine palish scrap, 5/3 to 5/3¼. 2 cases fair scrap, 3/3. 2 cases fine sheet and biscuits, 6/1¾. 1 case good cuttings, 5/1½.
Nikakotua	3 cases fine biscuits, 6/1¼. 1 case fine biscuits, darker, 6/1½. 1 case darkish scrap, 5/-.
B N E	1 case darkish scrap, bought in.
M M	1 bag scrap and pieces, bought in.
Halgolle	2 cases fine pale to dark biscuits, 6/1¾.
Galatura	1 case fine darkish biscuits, 6/1¾.
Duckwari	1 case fine small darkish biscuits, 6/1¾. 1 bag fine palish scrap, 5/-.
K K	2 cases fine biscuits, 6/1¾. 1 case fine scrap, 5/3¼ 1 case scrap and pieces, 5/3.
Halwatura	6 cases fine darkish biscuits, 6/1¾. 1 case fine scrap cuttings and pieces, 5/-. 2 cases fine scrap, 5/-.
Kahawatte	1 case good small pale Ceara biscuits, 6/-.

Straits Settlements.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
F I R	1 case red Rambong lump, bought in.
S P	1 case palish amber sheet, 6/1½. 1 bag pale pressed sheet, 6/-. 1 case thick rejected biscuits, 5/6. 1 case rough biscuits and sheet, 5/6. 1 bag rejected biscuits 5/-. 1 bag scrap, 5/3½.
L & P	6 cases fine pale washed ribbon, bought in. 1 case fine washed ribbon, darker, 5/7. 1 case fine pale washed ribbon, mixed 5/7. 1 case fine pale washed ribbon, palish to darkish, 6/-. 1 case fine washed ribbon, darker, 5/3¾.
L S H Para IR I	1 case dark rejected sheet, 5/11.
L S H	1 bag darkish scrappy sheet, 4/10.
N M	1 pkge. darkish Rambong biscuits and ball scrap, 4/9.
Cicely Estate	2 cases palish to darkish scrap, 4/11. 1 case rejected biscuits and scrap, 4/1. 1 bag rejected sheet, 5/3.
K M A	3 cases fine palish rolled sheet, 6/1¾.
Beverlac	2 cases dark scrap, bought in.
B B	1 case dark scrap, bought in.
M	3 cases very fine large biscuits, 6/2. 1 case very fine large biscuits, darker, 6/1¾.

JAVA.

Calorama	3 cases fine red Rambong, 4/1½. 1 case fine red Rambong, darker, 4/-.

13, ROOD LANE, LONDON, E. C.
March 16th, 1906.

At to-day's auction, 124 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which all but 3 were sold. The total weight amounted to about 6¼ tons, Ceylon contributing less than ¾ ton and the Straits Settlements rather more than 5½ tons.

These small supplies met with good competition, everything of importance changing hands at rates showing an advance on last sale of from ½*d.* 1½*d.* per lb. Fine sheet was again in much request, 9 cases from the Highland Estate realising 6/3½. Vallambrosa was also represented by a large invoice amounting to just over 2 tons which sold at an average of 6/2 per lb.

QUOTATIONS.—Fine sheet, 6/3 to 6/3½; fine pale crape, 6/3; darker, 6/2, and dark from 5/1½ to 5/4½: fine biscuits, from 6/2 to 6/3; rejected biscuits, from 5/6 to 6/-; good to fine scrap, 4/11 to 5/3½.

PLANTATION BISCUIT AND SHEET TO-DAY.—6/2 to 6/3½, same period last year, 6/4 to 6/9. Scrap, 4/11 to 5/3½, same period last year, 4/2 to 4/8 per lb.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

121 packages at 6/0½ per lb., against 139 packages at 5/10¼ per lb. at last auction. Particulars and prices as follows:—

CEYLON.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Kanambyle	2 pkgs. ball and rejected biscuits, 3/- and 6/-.
Tallagalla	1 case fine dark biscuits, 6/3. 1 case fine palish scrap, 5/3. 1 case barky scrap, 5/-.
Warriapolla	1 case very fine pale amber biscuits. 6/3. 1 bag very fine amber biscuits, 6/3. 3 cases fine pale biscuits, 6/3. 1 bag darkish biscuits, 6/3. 1 case ball scrap, bought in. 1 bag rough biscuits, 5/6.
Gikiyanakande	1 case dark rolled crape, bought in.
Baddegama	1 case fine palish to darkish biscuits, 6/3.
Wararaka	1 case fine darkish biscuits, 6/3. 1 case good palish scrap, 5/3.
Glencorse	2 cases very fine large palish biscuits, 6/3.
Dartry	1 case fine small and large palish biscuits and scrap, bought in.

STRAITS SETTLEMENTS.

S K P R	4 cases good small biscuits, 6/2. 1 case sheet scrap, 5/2.
S H P R	1 case rejected biscuits and sheet, 6/-. 1 case sheet scrap 5/2.
V R Co., FMS	44 cases very fine palish to darkish narrow scored sheet, 6/3–6/3¼. 3 cases rejected sheet, 6/2¼. 1 case fine pale pressed crape, 6/3. 1 case dark crape, 5/2½. 2 cases palish and darkish crape, 6/1. 2 cases dark crape, 5/1½.
Horse	2 cases fine palish sheet, 6/3. 1 bag rejections, 5/5.
Brink	1 case fine rolled scrap, 5/3.
L E MUAR	8 cases very fine pale crape, 6/3. 1 case dark crape, 5/3¼. 1 case fine darkish scored sheet, 6/3.
Straits C S L	1 bag fine pale scrap, 5/3½.
L & P F M S	1 bag fine pressed sheet scrap, 5/2½.
Add	1 case good palish scrap, 4/11.
Highland Estate	9 cases very fine amber scored sheet, 6/3½. 1 case very fine pale crape, 6/3. 4 cases fine crape, little darker, 6/2. 3 cases darker crape, 5/4½. 6 cases very dark, 5/2.
ASC AA	2 cases fine large darkish biscuits, 6/2¾. 2 bags good rejected biscuits and pieces, 5/8. 1 case fine darkish scrap, 5/3.

13, ROOD LANE, LONDON, E. C.
March 30th, 1906.

At to-day's auction, 177 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which 100 were sold. The total weight amounted to about 9 tons, Ceylon contributing 4½ and Straits Settlements 4¾.

This sale passed off quietly, competition being less keen for fine qualities, several parcels of which were withdrawn for lack of support. There was, however, little alteration in price, 6/3¼ being realised for one small lot of Fine Sheet. For Fine Biscuits and Sheet the price generally offered was about 6/3.

Scrap was again in good demand, rates showing an advance on last sale of up to 1½*d.* per lb.

QUOTATIONS.—Fine sheet, 6/2¾ to 6/3¼.
Fine pale washed ribbon, 6/3.
Fine biscuits, 6/2¾ to 6/3.
Rough biscuits and rejections, 5/8 to 6/1¼.
Fine Red Rambong, 4/6.
Scrap, fine, 5/3 to 5/5.
Medium, 4/5 to 4/10½.
Low dirty, 2/7 to 3/10.

PLANTATION BISCUITS AND SHEET TO-DAY.—6/2¾ to 6/3¼, same period last year, 6/4 to 6/6.

PLANTATION SCRAP.—4/5 to 5/5, same period last year, 3/9 to 4/7.

FINE HARD PARA (South American).—5/5¼, same period last year, 5/6.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

100 packages at 5/11 per lb., against 121 packages at 6/0½ per lb. at last auction. Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Tallagalla	1 case fine biscuits, bought in. 1 case scrap, 5/3¾.
Ambatenne	4 cases fine amber biscuits, 6/3. 2 cases fine pale scrap, 5/4½.
Warriapolla	1 case ball scrap, bought in.
Gikiyanakande	1 case dark rolled crape bought in.
Rangbodde	1 case fine pale Ceara biscuits, bought in.
Hattangalla	2 cases very fine palish clear biscuits, 6/2¾. 1 case fine pale scrap, 5/4½.
Ellakande	1 case good darkish biscuits, 6/2¾. 1 case fine palish scrap, 5/4½.
Culloden	9 cases very fine pale amber biscuits, 6/3. 1 case good cuttings 5/6¼. 5 cases fine palish scrap, 5/5. 2 cases dirty scrap, 3/3.
V S K M	1 case good biscuits, 6/1¼. 1 bag darkish scrap, 5/0½.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
D & Co.	4 cases fine amber sheet, 6/2¾. 2 cases good darkish scrap, 5/3½. 1 case scrap and pieces, 5/2¾.
Suduganga	1 case good darkish biscuits, bought in. 1 bag pressed sheet and scrap, bought in.
Tudugalla	17 cases fine palish biscuits, part sold. 5 cases fine palish scrap, 5/5—5/5¼. 6 cases dark dirty scrap, bought in.
F B	1 case darkish cloudy biscuits, bought in. 2 cases good palish biscuits, bought in. 2 pkgs. biscuits, heated rejections and scrap, bought in. 2 pkgs. fine palish biscuits, bought in. 3 cases rough biscuits, 6/-.
Clontarf	1 case good biscuits, bought in. 1 case fine scrap, 5/4¾.

STRAITS SETTLEMENTS.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
WPM	4 cases fine amber sheet, 6/3¼. 1 case darker, bought in. 2 cases fine pale scrap, 5/3¾.
B N B A	3 cases fine pale thin sheet, bought in. 1 case fine pale thin biscuits, bought in.
B N S	2 cases rejections, 5/2¼—5/8¼. 1 case fine pale scrap, 5/4. 1 bag dirty scrap, 2/7.
P R H	1 case scrap and rejections, 5/3. 1 case scrappy sheet and rejections, 5/4¾. 1 case fine pale scrap, 5/4.
G M S B	6 cases fine amber sheet, 6/3. 1 case fine pale scrap, 5/4¼. 1 case scrappy sheet, 4/6¼.
P R S B	3 cases fine amber sheet, 6/3. 1 case darkish scrap, 4/10½.
LSH	1 case fine amber sheet, 6/2¾.
EHB G R	1 case fine red Rambong, 4/6. 1 case scrap, 4/7. 1 case good palish sheet, 6/2¾. 1 case pressed pale sheet, 6/2¾.
L & P F M S	8 cases fine pale washed ribbon, 6/3.
S RC	25 cases fine palish to darkish scored sheet, 6/3 offered. 2 cases fine large darkish biscuits, bought in.
PSE	4 cases fine palish sheet, bought in.
S R R	1 case fine palish sheet, 6/3. 1 case dark pressed scrap, 4/5.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
KIN	2 cases fine amber sheet, bought in.
TIT	2 pkgs. fine palish and dark scrap, bought in.
W O O	1 case fine amber sheet, 6/2¾ 1 case good scrap, bought in.
KM	2 cases fine pale thin sheet, 6/2¾. 1 bag rough sheet, 5/8. 1 case rejections, 3/10.
FB	4 pkgs. biscuits, sheet and rejections, bought in. 3 cases good darkish biscuits, bought in.

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Fortnight ending 15th March, 1906.

Wired at 4 p. m. on 16th March, 1906.

				Tons.
Tin	Str.	Singapore & Penang to	United Kingdom &/or	1,001
Do.	,,	Do.	U. S. A.	185
Do.	,,	Do.	Continent	320
Gambier	,,	Singapore	Glasgow	...
Do.	,,	Do.	London	...
Do.	,,	Do.	Liverpool	50
Do.	,,	Do.	U. K. &/or Continent	...
Cube Gambier	,,	Do.	United Kingdom	10
Black Pepper	,,	Do.	Do.	...
Do.	,,	Penang	Do.	50
White Pepper	,,	Singapore	Do.	50
Do.	,,	Penang	Do.	10
Pearl Sago	,,	Singapore	Do.	160
Sago flour	,,	Do.	London	100
Do.	,,	Do.	Liverpool	1,400
Do.	,,	Do.	Glasgow	150
Tapioca Flake	,,	Singapore & Penang	United Kingdom	340
T. Pearl & Bullets	,,	Do.	Do.	160
Tapioca Flour	,,	Penang	Do.	230
Gutta Percha	,,	Singapore	Do.	55
Buffalo Hides	,,	Do.	Do.	125
Pineapples	,,	Do.	Do.	24,000
Gambier	,,	Do.	U.S.A.	...
Cube Gambier	,,	Do.	Do.	...
Black Pepper	,,	Do.	Do.	45
Do.	,,	Penang	Do.	30
White Pepper	,,	Singapore	Do.	20
Do.	,,	Penang	Do.	...
Tapioca Pearl	,,	Singapore & Penang	Do.	200
Nutmegs	,,	Do.	Do.	16
Sago Flour	,,	Singapore	Do.	...
Pineapples	,,	Do.	Do.	cases 1,250
Do.	,,	Do.	Continent	1,250
Gambier	,,	Do.	South Continent	...
Do.	,,	Do.	North Continent	90
Cube Gambier	,,	Do.	Continent	40
Black Pepper	,,	Do.	South Continent	230
Do	,,	Do.	North Do.	35
Do.	,,	Penang	South Do.	...
Do.	,,	Do.	North Do.	...

White Pepper	Str.	Singapore	South Continent	25
Do.	,,	Do.	North Do.	55
Do.	,,	Penang	South Do.	...
Do.	,,	Do.	North Do.	...
Copra	,,	Singapore & Penang	Marseilles	100
Do.	,,	Do.	Odessa	100
Do.	,,	Do.	Other South Continent	150
Do.	,,	Do.	North Continent	700
Sago Flour	,,	Do.	Continent	975
Tapioca Flake	,,	Singapore & Penang	Do.	50
Tapioca Pearl	,,	Do.	Do.	80
Do. Flake	,,	Do.	U. S. A.	10
Gambier	,,	Do.	Do.	...
Cube Gambier	,,	Do.	Do.	...
T. Flake and Pearl	,,	Do.	Do.	...
Sago Flour	,,	Do.	Do.	...
Gambier	,,	Do.	S. Continent	...
Copra	,,	Do.	Marseilles	...
Black Pepper	,,	Do.	S. Continent	...
White Pepper	,,	Do.	Do.	...
Do.	,,	Do.	U. S. A.	...
Pineapples	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Black Pepper	,,	Do.	Do.	...
Do.	,,	Penang	Do.	...
White Pepper	,,	Do.	Do.	...
T. Flake and Pearl	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do	...
Copra	,,	Singapore	Do.	...

1,250 tons Gambier } Contracts
310 ,, Black Pepper }

Exports Telegram to Europe and America.

Fortnight ending 31st March, 1906.

Wired at 4.30 p. m. on 2nd April, 1906.

Tin	Str.	Singapore & Penang	to United Kingdom &/or	1,801
Do.	,,	Do.	U. S. A.	270
Do.	,,	Do.	Continent	283
Gambier	,,	Singapore	Glasgow	...
Do.	,,	Do.	London	25
Do.	,,	Do.	Liverpool	...
Do.	,,	Do.	U. K. &/or Continent	110
Cube Gambier	,,	Do.	United Kingdom	20
Black Pepper	,,	Do.	Do.	40
Do.	,,	Penang	Do.	50
White Pepper	,,	Singapore	Do.	60
Do.	,,	Penang	Do.	...
Pearl Sago	,,	Singapore	Do.	260
Sago Flour	,,	Do.	London	125
Do.	,,	Do.	Liverpool	...
Do.	,,	Do.	Glasgow	...
Tapioca Flake	,,	Singapore & Penang	United Kingdom	80
T. Pearl & Bullets	,,	Do.	Do.	120
Tapioca Flour	,,	Penang	Do.	320
Gutta Percha	,,	Singapore	Do.	95
Buffalo Hides	,,	Do.	Do.	20

Pineapples	Str.	Singapore	United Kingdom	11,250
Gambier	,,	Do.	U. S. A.	600
Cube Gambier	,,	Do.	Do.	140
Black Pepper	,,	Do.	Do.	110
Do.	,,	Penang	Do.	80
White Pepper	,,	Singapore	Do.	65
Do.	,,	Penang	Do.	10
Tapioca Pearl	,,	Singapore & Penang	Do.	270
Nutmegs	,,	Do.	Do.	29
Sago Flour	,,	Singapore	Do.	470
Pineapples	,,	Do.	Do.	cases 600
Do.	,,	Do.	Continent	2,000
Gambier	,,	Do.	S. Continent	320
Do.	,,	Do.	N. Continent	175
Cube Gambier	,,	Do.	Continent	20
Black Pepper	,,	Do.	S. Continent	150
Do.	,,	Do.	N. Continent	180
Do.	,,	Penang	S. Continent	...
Do.	,,	Do.	N. Continent	...
White Pepper	,,	Singapore	S. Continent	5
Do.	,,	Do.	N. Continent	110
Do.	,,	Penang	S. Continent	...
Do.	,,	Do.	N. Continent	10
Copra	,,	Singapore & Penang	Marseilles	260
Do.	,,	Do.	Odessa	560
Do.	,,	Do.	Other S. Continent	100
Do.	,,	Do.	N. Continent	740
Sago Flour	,,	Singapore	Continent	430
Tapioca Flake	,,	Singapore & Penang	Continent	550
Tapioca Pearl	,,	Do.	Continent	225
Do. Flake	,,	Do.	U. S. A.	170
Gambier	,,	Do.	Do	...
Cube Gambier	,,	Do.	Do.	...
T. Flake and Pearl	,,	Do.	Do.	...
Sago Flour	,,	Do.	Do.	...
Gambier	,,	Do.	S. Continent	...
Copra	,,	Do.	Marseilles	...
Black Pepper	,,	Do.	S. Continent	...
White Pepper	,,	Do.	Do.	...
Do.	,,	Do.	U. S. A.	...
Pineapples	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Black Pepper	,,	Do.	Do.	...
Do.	,,	Penang	Do.	...
White Pepper	,,	Do.	Do.	...
T. Flake & Pearl	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Copra	,,	Singapore	England	..

1,200 tons Gambier } Contracts.
400 ,, Black Pepper }

SINGAPORE MARKET REPORT.

March, 1906.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	$ c.	$ c.
Coffee—Palembang	...	...	...
Bali	35	21.00	21.00
Liberian	77	25.00	20.00
Copra	1,120	7.50	7.00
Gambier	2,490	7.60	7.20
Cube Gambier, Nos. 1 and 2	125	11.12½	10.62½
Gutta Percha, 1st quality	...	300.00	150.00
Medium	...	200.00	90.00
Lower	...	80.00	12.00
Borneo Rubber 1, 2 and 3	...	130.00	76.00
Gutta Jelutong	...	5.80	5.50
Nutmegs, No. 110's	...	36.00	33.00
No. 80's	...	56.00	53.00
Mace, Banda	...	80.00	72.00
Amboyna	...	65.00	56.00
Pepper, Black	673	20.75	20.00
White (Sarawak)	450	29.00	28.25
Pearl Sago, Small	130	4.40	4.00
Medium	...	...	...
Large	...	...	...
Sago Flour, No. 1	1,733	3.05	2.55
No. 2	100	1.20	0.87½
Flake Tapioca, Small	616	9.00	7.75
Medium	...	...	...
Pearl Tapioca, Small	67	8.75	7.50
Medium	320	8.80	7.00
Bullet	...	...	...
Tin	1,375	83.62½	80.30½

Singapore.

Abstract of Meteorological Readings for the month of March, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	Ins.	°F	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory	29·918	144·8	81·4	88·8	75·2	13·6	78·1	·891	75·8	80	N.E.	11·81	3·09
Botanic Gardens Singapore	...	...	...	...	...	...	...	...	...	...		8·47	1·75

A. B. LEICESTER,
Meteorological Observer.

D. K. McDOWELL
Principal Civil Medical Officer, S. S

Kandang Kerbau Hospital Observatory,

SINGAPORE, 25*th April*, 1906.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of March, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29·901	153·8	82·5	92·0	75·0	17·0	77·7	·846	73·49	71·0	N.W	2·20	1·11

PRISON OBLERVATORY,
PENANG, *9th April,* 1906.

M. E. SCRIVEN,
Assistant Surgeon.

S. LUCY,
Acting Colonial Surgeon, Penang.

Malacca.

Abstract of Meteorological Readings for the month of February, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	%	%		Ins.	Ins.
Durian Daun Hospital ...	29·835	150·3	79·3	89·3	69·9	19·5	81·0	1·045	62·1	93	N.E.	5·26	1·37

F. B. CROUCHER,
Colonial Surgeon, Malacca.

COLONIAL SURGEON'S OFFICE,

MALACCA, *22nd March*, 1906.

Malacca.

Abstract of Meteorological Readings for the month of March, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	%	%		Ins.	Ins.
Durian Daun Hospital ...	29·839	150·5	79·3	89·1	69·7	19·4	81·4	1·045	62·4	94	N.E.	4·83	1·24

COLONIAL SURGEON'S OFFICE,

MALACCA, 23*rd April*, 1906.

F. B. CROUCHER,

Colonial Surgeon, Malacca.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of March, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping ..	...	154	82·86	93	72	21	78·42	913	...	82	...	11.21	1·55
Kuala Kangsar ...	...	...	81·60	95	68	27	76·72	856	...	79	...	3·51	1·47
Batu Gajah ...	...	...	82·92	94	71	23	78·01	894	...	80	...	6·00	1·53
Gopeng ...	...	...	81·33	95	69	26	76·61	854	...	80	...	4·19	·79
Ipoh ...		...	83·04	94	73	21	78·61	919	...	82	...	3·22	·68
Kampar ...	...	...	...	95	70	25	...	...	...	...	..	10·23	2·50
Teluk Anson ...	...	...	83·11	94	71	23	78·39	908	...	81	...	5·45	1·18
Tapah ...	...	...	82·54	95	68	27	77·54	877	...	79	...	9·34	2·29
Parit Buntar ...	...	...	82·72	92	72	20	77·93	892	...	80	...	6·07	2·50
Bagan Serai ...	...	...	82·52	92	71	21	77·70	886	...	80	...	10·56	3·55
Selama ...	...	...	82·60	92	71	21	78·09	901	...	81	...	8·09	2·86

STATE SURGEON'S OFFICE,
TAIPING, 17*th April*, 1906.

M. J. WRIGHT,
State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of March, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·885	150·8	80·8	90·9	71·8	19·1	76·5	0·831	73·6	79	Calm.	6·30	0·94
Pudoh Gaol Hospital "	...	...	...	...	...	...	...	...	...	...	...	7·16	1·32
District Hospital "	...	...	...	...	...	...	...	...	...	...	...	7·00	1·73
" Klang	...	...	...	88·5	70·2	18·3	...	...	...	...	...	8·87	1·42
" Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	5·65	2·46
" Kajang	...	...	...	93·1	72·3	20·8	...	...	...	...	...	13·17	2·48
" Kuala Selangor	...	...	...	...	...	...	...	...	...	...	...	5·52	2·36
" Kuala Kubu	...	...	...	92·3	71·4	20·9	...	...	...	...	...	7·77	1·71
" Serendah	...	...	...	91·5	69.3	22·2	...	...	...	...	...	9·68	1·88
" Rawang	...	...	...	92·7	66·6	26·1	...	...	...	...	...	7·34	1·15
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	5·27	1·45
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	...	4·56	1.85

STATE SURGEON'S OFFICE,

KUALA LUMPUR, *23rd April*, 1906.

E. A. O. TRAVERS,

State Surgeon, Selangor.

Pahang.

Abstract of Meteorogical Readings in the various Districts of the State for the month of November, 1905.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	91·0	70·0	16·30	...	...	...	...	...	12·82	1·55
Raub ...	...	...	...	90·0	69·0	16·75	...	...	...	...	...	11·44	2·83
Bentong ...	...	...	...	90·0	69·5	14·92	...	...	...	...	...	16·69	3·20
Pekan ..	...	...	...	90·0	73·0	10·00	...	...	...	...	...	32·82	9·00
Kuantan ...	...	...	...	92·0	71·0	13·13	...	..	...	...	...	24·05	10·02
Temerloh ...	...	...	...	91·0	70·0	13·46	...	...	...	...	...	9·61	1·10
Sungei Lembing ...	...	...	...	86·0	67·5	12·20	...	...	...	...	...	24·82	5·04

KUALA LIPIS,

24th March, 1906.

K. TAMBY,

for State Surgeon, Pahang.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of Decembor, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	91·0	69·0	16·16	...	...	...	...	...	4·12	·62
Raub ...	...	...	...	90·0	68·0	17·43	...	...	...	...	...	6·15	1·53
Bentong ...	...	...	...	90·5	67·0	15·70	...	...	...	...	...	8·51	1·24
Pekan ...	...	...	...	86·0	72·0	9·30	...	...	...	...	...	15·57	3·85
Kuantan ...	...	...	...	90·0	70·0	12·80	...	...	...	...	...	12·38	2·86
Temerloh ...	...	...	...	92·0	68·0	15·87	...	...	...	...	...	7·00	·95
Sungei Lembing ...	...	...	...	88·5	66·0	16 27	...	...	...	...	...	15·14	1·82

KUALA LIPIS,

7th April, 1906.

K. TAMBY,

for State Surgeon, Pahang.

The Duff Development Company, Limited, Kelantan.

Abstract of Meteorological Readings for the month of March, 1906.

DISTRICT.	Temperature.			Total Rainfall.	Greatest Rainfall during 24 hours.
	Maximum.	Minimum.	Range.		
	Mean. °F	Mean. °F	Mean. °F	Inches.	Inches.
Kuala Lebir ..	90·8	70·5	20·3	2·74	1·25
Ulu Liang ...	91·6	70·7	20·9	2·40	1·50
Serasa ...	94·0	72·0	22·0	2·02	1·05
Kuala Kelantan ...	88·0	71·0	17·0	2·16	1·10

SURGEON'S OFFICE,
10*th April*, 1906.

JOHN D. GIMLETTE,
Surgeon.

No. 4.] APRIL, 1906. [Vol. V.

AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

EDITED BY
H. N. RIDLEY, M. A., F. L. S.,
Director of Botanic Gardens, S. S.
AND
J. B. CARRUTHERS, F. L. S.,
Director of Agriculture, F. M. S.

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NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, &c. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valua-"tion regarding new or little known natural or manufactured pro-"ducts of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M.A., F.R.S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given.

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

No. 4.] APRIL, 1906. [Vol. V.

H. WRIGHT'S PARA RUBBER.

(Review.)

Though this book was published some time ago, the edition was so small that it is only within a few days ago that we were able to procure a copy; hence any delay in noticing it. The book was wanted as there was no other book on the subject at all up to date but Mr. JOHNSTON'S work. Since then a great deal of progress has been made in every thing connected with the work of growing and making rubber. And now that Mr. WRIGHT'S excellent little work is out of print and that much more is known about rubber we shall hope to see another and larger edition soon on the market. The work deals chiefly with rubber in Ceylon, and perhaps too little with the rubber country par excellence, *viz.*, the Malay Peninsula. It commences with a short history of the introduction of rubber into Ceylon in which it is said that India and the Straits have received a considerable number of Ceylon rubber seeds and plants the first consignments dating from 1877, when cuttings from one year-old trees were sent from Peradeniya. The plant however, only arrived at Kew in November, 1876, and then had to be propagated before 100 plants could be sent to Ceylon. It is only a matter of historical interest but it is clear from the archives of the Botanic Gardens and MURTON'S reports, that these cuttings were not received or were dead. No mention of them at all is made anywhere, and it is clear from Sir HUGH LOW'S letters that no living cuttings were in his possession in 1879, nor any plants but those brought by MURTON and received from Kew direct. Many years later seeds were received from Ceylon however, but by that time the original trees in the Botanic Gardens at Singapore had fruited. This is only a historical matter as stated before and the full history of the introduction of rubber into the Straits and Malay Peninsula has been published in the Bulletin previously.

The physiology of the plant next is dealt with, and the important question of the function of the latex the author seems to have collected what is known or suggested by various botanists, but what a little it is! No doubt as GROOM suggests the functions of latex are different for different plants.

The various suggestions for its use to the plant are as a water store, as a reserve food, as a protection against insects or fungi, or finally it may be an excretory product.

In the case of Para rubber at least I should be rather doubtful of its being either a water-store or a protection against excessive transpiration. Were latex destined for this purpose we should have an excess of laticiferous plants in xerophytic localities. This is however not the case, a very large part of the trees of our flora here are laticiferous. We have plenty of Apocynaceous trees and climbers Urticaceous trees, *Ficus*, *Artocarpus*, *loetia* and Sapotaceous trees *Palaquium*, *Payena*, *Bassia*, etc.

Of these trees nearly all are inhabitants of permanently wet jungles, and so far from being specially protected against drought by this latex system, many of them have considerable difficulty in standing exposure to sun, and those plants of these orders which grow in exposed places seem to have less latex than their congeners living in shaded permanently wet forests. There are of course, laticiferous plants which grow in deserts, such as *Manihot Glaziovii* and the *Euphorbias* but the proportion is not so large I think, as it is in the Rain belt.

The little laticiferous *Phyllanthus Urinaria* grows side by side with non-laticiferous weeds like *Spermacoce*, and *Vandellia* on our paths exposed often to very hot sun; yet *Phyllanthus* can stand the sun no better than the other weeds. In Christmas Island when we were there in a very hot and dry period the plant that appeared to suffer most was the laticiferous *Ochrosia Ackeringae* which remained quite drooping and wilted all day, while the other non-laticiferous trees were fresh and green.

As a reserve food one may doubt its use, as it appears in most cases to contain so little sugar or starch or any other food substance and as there seems no natural way in which it is removed from the plant it is hard to see how it can be considered merely as an excretory product.

There remains of suggestions only the one of its acting as a protection against the intrusion of fungus spores and insects into wounds. That it does so is obvious to every one. Is this of sufficient importance to be at least a main use of the latex? I would point out that the greater part of the trees of the equatorial belt, the rain forest region, are provided with either a latex, gum or resin, which exudes in a wound as soon as it is made and that this is especially the case in soft wood trees, or trees with soft sap wood. The *Dipterocarpaceœ*, all exude resin or oil; *Anacardiaceœ*, a black resin; *Burseraceæ*, resin; *Apocynaceœ*, *Sapotaceæ*, all the big *Urticaceceæ* and many of the *Euphorbiaceœ* latex; *Guttiferœ*, a gum resin *Leguminosœ* (*Pterocarpus*, etc.) *Styraceœ* (*Styrax*) *Hypericineœ* (*Cratoxylon*) *Loganiaceœ*, (*Fagrœa*), *Coniferæ*, and Palms, all when wounded exude a gum, resin or latex which acts as a protection against animal and fungus attacks.

The protection is by no means always perfect, as insects or fungi occasionally find a way of getting past the barrier. Take for instance *Castilloa.* This plant is here destroyed by the longicorn beetle, *Epepseotes luscus.* It attacks the plant through the thin spot where a branch has fallen, and where there is little or no latex, once the egg is pushed through into the wood, the larva does not come in contact with the latex but bores up and down in the wood. The part of the tree attacked by it dies and the beetle can escape through the wood now unprovided with latex. A tree like this is quickly exterminated. The failure of the latex in this case to protect the tree means the total destruction of all Castilloas in the region in which the beetle lives. Besides wood-boring insects we have innumerable fungi which attack dead tissue and can eventually hollow out a tree so that it readily falls. If it is worth while, so to say, for the *Oncosperma*, and thorny sago to develop thorns to protect their young shoots from the attacks of pigs, or for the *Arenga* palm to develope the great mass of fibre over the bases of its leaves to keep the rain from running down into the sheaths, surely it is worth while for a tree to develop a laticiferous system, or a series of resin ducts to guard against the common injuries caused by a heavy wind, or the fall of a tree near it.

I would not suggest this as the only function of latex, but rather that it is one of the utmost importance to the life of the plant.

The Conditions in Para.

It has been pointed out by WICKHAM, says Mr. WRIGHT that the true forests of the Para rubber trees lie back on the highlands and those seen by travellers along the river-side are scattered and poor in growth and do not give one a fair idea of the conditions under which a good growth of the Hevea is obtained. On this statement apparently an idea got about that Para rubber should not be grown on the alluvial flat as it is in the Malay Peninsula but in hilly regions. This idea of the *Hevea braziliensis* growing on hill land has not been confirmed by any of the professional Seringueiros from the Amazons who have visited the Gardens, nor is it at all confirmed by ULE, whom the author quotes. All agree that the lowlying swamp in the Singapore Botanic Gardens exactly resembles the home of the Para rubber, and that the trees have the same form and growth. May it not be that in the districts that Mr. WICKHAM visited all the best of the trees on the easily accessible river bank had been tapped to death, while those on the more inaccessible highlands had escaped. This is what one would expect to happen.

Manuring and close planting.—The danger of manuring trees by the system of digging trenches and so cutting through the roots as recommended by Mr. WRIGHT has been already pointed out in the Bulletin, as has the principle of close planting either of Para rubber trees or Dadups or any other trees and then cutting out. No interference with or cutting the roots of a Para rubber tree should be allowed under any circumstances. Green soiling should be done only with herbaceous plants, and these should be merely cut and thrown on the ground not dug in. The manuring experiments made in the Botanic Gardens of Singapore some years ago are not even alluded to.

Draining.—The importance of this is well described. It is worth noting however, that trees should not be planted too near the drains especially if not very deep, it has been observed in the Singapore Botanic Gardens that in wet stormy weather big trees too close to the drains are very apt to fall, owing to their roots being too short on the drain-side and not getting a sufficient hold.

Tapping Instruments.—There is a fairly complete account of the various tapping instruments suggested or used; and figures of a number of them being published. Every one has his own fancy as to what tools to use, but we venture to predict that specimens of most of these will only be visible in museums in a few years. After trying a large series in the Botanic Gardens, Singapore, we have come back to the old chisel and mallet originally used as the best and simplest.

The spiral system is at present under experiment and we shall hope to have something to say about it later.

Methods of preparation, coagulation and machinery for such purposes are described; the main objects being to eradicate the proteids and sugar, which otherwise rots the rubber. In this connection it may be interesting to note that there are samples of Para rubber taken from the Botanic Gardens trees in the Gardens Museum which were taken about ten years ago, simply allowed to coagulate in the tins and put to dry, without any attempt to clean them or get rid of the proteids except by their own decomposition. The rubber is black like that of Forest Para, but is sound and strong, fully tensile and very elastic to the present day.

The chapter on diseases of the plant is short and might have been much enlarged with advantage.

The most important of all pests *Fomes semistostus* is barely alluded to though a good deal has been published about it.

The whitewash fungus *Corticium calceum*, another important disease is not alluded to. This fungus was described some time back in the Bulletin though not identified till after the book was written.

The work ends with a chapter on what to do with the seeds, with methods of transport of them, in which the expensive and as we have found, unsatisfactory method of shipping in Wardian cases is recommended for long distances. The method adopted in Singapore of packing in slightly damped charcoal has given far the best results up to date. Coconut dust and saw dust as recommended by Mr. MACMILLAN I would unhesitatingly condemn.

An Appendix in cost of opening an estate in Ceylon closes the work; useful, but we should like to see a similar one added for cost of opening in the Malay Peninsula, the future headquarters of the rubber cultivation.

The whole work is good, useful and full of information, besides being very suggestive. The next edition we shall hope to see including the latest works on the subject and rather fuller of some of the older observations which have been made by ULE and others in the Amazons forests. Information grows daily, and the amount of important little facts published in various journals and papers from day to day is extremely large.

H. N. RIDLEY.

ON THE LIFE HISTORY OF TERMES (COPTOTERMES) GESTROI.

THE HEVEA RUBBER TERMITE.

BY E. P. STEBBING (DEHRA DUN, UNITED PROVINCES, INDIA.)

For some years past it has been known that the rubber plant *Hevea braziliensis* in the Malay Archipelago has been subject to the attacks of a species of termite known as *Termes* (*Coptotermes*) *Gestroi*. This insect had been reported from Borneo and Singapore and also subsequently from the Straits Settlements. In 1898 the late G. D. HAVILAND wrote as follows upon this termite:—"This species is remarkable for its habit of killing live trees. It encloses the trunk with a thick crust of earth; under cover of this crust it eats through weak spots in the tree to the heart of the wood."

In a note in the Agricultural Bulletin of the Straits and Federated Malay States, H. N. RIDLEY, the Editor, mentions that Para rubber trees when growing in grass appear to suffer just the same from the attacks of this pest. In a subsequent issue R. PEARS corroborates this statement and says that the same is the case when the trees are growing in "lalang." Neither the grass nor the "lalang" appear to form any hindrance to them "as they carry on their labours as vigorously as ever, destroying several adjacent trees as they would do if the ground were clear." From the observations detailed below the reason for this behaviour will appear. Since the insect work beneath the ground the presence or absence of vegetations round the trees can have little effect upon their operations.

In May of last year I received a communication from Mr. F. B. MANSON, at the time Conservator of Forests in Tenasserim, informing me that he had received a report from the Manager of the Mergui Rubber Plantation (Mr. J. W. RYAN) stating the trees were being attacked by species of termites. A copy of this report, to which I shall allude later, was sent to me together with three different specimens of the termites committing the damage.

Two of these have now been identified by M. DESNEUX, the well-known authority on the *Termitidæ*, as *Termes Gestroi* and a species of Termes closely allied to *T. annamensis*, Desn., which had previously been reported from Annam. No identification of the remaining specimens sent has yet been found possible owing to workers only having been received. We will consider these insects in detail:—

Termes Gestroi.

The workers are elongate, pale yellowish white insects with the head small, pale; the first thoracic segment enlarged and broader than the two following.

The body is oval, broader than the meso, and metathorax and bluntly pointed posteriorly. Length ¼th inch.

The soldier is smaller than the worker. The mandibles black, prominent and crossed over one another. First thoracic segment enlarged and orange in colour; rest of insect yellower than in worker; legs more elongate and powerful. Length 1/5th inch.

According to Mr. RYAN this termite attacks the tree at the crown of the root and eats its way upwards, hollowing out the trunk. Since the white ants commence their work well below the ground, there is no indication of their presence until the trees begin to show signs of withering. The damage has then gone too far for it to be possible to save the attacked tree. The branches begin to die and drop and the tree itself falls in the first strong breeze.

It would appear that *Termes Gestroi* attacks the tree for the purpose of obtaining the rubber from it, for, on applying pressure to the bodies of the termites, it was found that the majority of them were full of fresh latex. They apparently collect and store the rubber, masses of rubber being found as a rule in the nests, which are usually situated at the crown of the root. From one of these nests situated at the base of a three-foot girth tree as much as 2 lbs. of rubber was collected.

An examination of the crown portion of the root of a tree shows that the main direction of the galleries made by the termite is horizontal, *i.e.*, parallel with the long axis. These galleries are of considerable size, ramifying a great deal, have smooth sides, and are connected here and there by holes or short galleries eaten out in a vertical direction. The galleries practically form an intricate mass of chambers which are kept quite free of earth and some of which are evidently stored with a certain amount of rubber. In the specimen of the root I have examined, it is apparent that the work of the termite is entirely confined to the crown of the root, none of the tunnels extending upwards into the stem (in the present case stems, for there were two taking off from the root).

ADDITIONAL INSECTS PRESENT WITH *Termes Gestroi* IN THE NEST.

In the tube containing the specimens of *Termes Gestroi* I found grubs and pupae of other insect forms present.

(1) At least two different kinds of Heterocerous larvae were present, both probably noctuids.

(2) Immature pupae of a species of coleoptera, perhaps a coccinellid (*Coccinellidæ*). The pupae were, however, quite unknown to me.

The presence in the nest of these other forms of insect life is of very considerable importance. One or more of them may be predaceous upon the termites. It may be pointed out here that should such prove to be the case the knowledge would be of the very first importance in considering measures for combating the termite.

Termes sp. near Annamensis, DESN.

This Termes was taken from a nest situated in the ground in the plantation a few feet away from the rubber trees. It was thought by the Manager to be identical with *Termes Gestroi.* It is, however, a different species, and as far as is at present known causes no damage to the rubber trees.

Termes (?) *sp.*

Only workers having been as yet procured of this species it is impossible to identify it at present. Mr. RYAN states that the insects build their galleries on the outside of the trunk and feed on the dead bark, thus following the usual procedure of *Termes taprobanes* in Sal forests. The Manager mentions that he has never found the insect to injure the rubber trees in any way, nor has he ever found any latex in their bodies. Since this insect is present in the plantations it will be of interest to have it identified. For this purpose the other members of the community are required. By tracing down the earth galleries on the bark of the tree to the base of the latter and turning up the earth all round it, it will be possible to obtain them and thus to have this point settled.

POINTS IN THE LIFE HISTORY OF *Termes Gestroi* REQUIRING FURTHER OBSERVATION.

We at present know little about the life history of *Termes Gestroi* and since it appears more than probable that the termite is likely to prove a source of very considerable loss in rubber plantations, unless its action is thoroughly understood, it behoves those in charge of such areas to endeavour to do all in their power to procure all information possible upon its life history and methods of attack. The following are some of the points requiring further observations and elucidation.

1.—The period of the year at which the termites are active and commit injury to the trees.

2.—Is the rubber in the nest used as food by the termite ?

(*a*) To feed the young larvae.

(*b*) To serve as food during the period of inactivity, if there is one.

3.—The origin of the nest. How is it first formed ?

4.—Where do the termites found in the nest in the crown of the root come from in the first instance ?

5.—Length of time which elapses from period of first attack to time the tree is seen to be dying.

6.—Depth below the surface at which the termites work.

7.—Proportion of active workers to non-workers in a community.

8.—Do the insects always work in the dark ?

9.—It is possible to reach the nest without killing the tree ?

10.—The position occupied by the king and queen termites in the nest.

11.—Are there any subsidiary galleries radiating from the central nest to other parts of the plantation, either above or below ground ? If so, where do these go ?

12.—Is the nest connected in any way with adjacent ones in neighbouring trees.

13.—The parts played by the heterocerous larvae and the grub and beetle of the coleopterous pupa found in the nest.

These are some of the points which occur to me as requiring solution. Doubtless others will present themselves to Managers on the spot. Until we have answers to these questions from careful observations made on the spot, it is almost impossible to say what would be the best way of combating this extremely serious pest. So much money has been, and is being, put into rubber plantations in what may be termed the Indo-Malayan region, which is evidently the home of *Termes Gestroi*, that it behoves us to take up this question of the study of its life history fully and without delay.

I shall be exceedingly obliged if readers of this note will kindly send me all the information they can procure upon the insect at an early date.

Indian Forester Vol. XXXII, *p. 110.*

NOTE ON THE ABOVE.

This paper by Mr. STEBBING seemed well worthy of reproducing in the Bulletin as not only does it go as far as is known into the history of the pest, but propounds a series of queries which some of the planters might be able to answer.

The statement that the termite eats the rubber seems highly improbable and surely requires verification. Rubber is of course found in the hollow of the tree having exuded inwards from the bark. The termites in ordinary trees bore from the hollow trunk outwards and pushes through the bark and in so doing in Para trees doubtless cuts into the laticiferous ducts and bleeds the tree inwardly, but is the statement that their bodies are full of latex correct. The insect lives on all kinds of trees, many containing no latex or resin of any kind, and it would be odd if it had suddenly developed into a devourer of latex, still more if it ate solid rubber. It exudes from its mouth a milky substance like latex to defend itself as other species do. Can this have been mistaken for latex?

There is by no means always, if often, signs of withering in a tree attacked before death. I have seen a large shrub of *Mimosa sepiaria* apparently in the best of health, flowering and fruiting, in which most of the twigs, with the boughs and trunk were hollowed out and filled with mud. A *Garcinia* badly attacked and finally killed showed also no signs of withering till it suddenly died. Recently I saw an old Rambutan tree, nearly dead which had been badly attacked at some time by the termite, but they had all left it evidently long time, and had not killed it though, perhaps, had hastened its death.

To Mr. STEBBING'S question 8. Do the termites always work in the dark? The answer is easy. Certainly they do, unless compelled accidentally to come into the light. If one removes, for instance, a piece of the outer crust covering the tree trunk, and put tar on the termites will come out and excrete a drop of liquid mud (faeces) on the tar till they have covered it up again.

In answer to question 12. There is good reason to believe that the nest in the tree is connected with that in another. I have seen a rubber tree attacked on the edge of a plantation and just opposite a tree in the jungle which had also been killed by them. Apparently the termites had tunnelled under the path, a fairly broad one, to the rubber tree. It was difficult to verify this accurately as every one who has studied the underground termites knows how extremely difficult it is, if not impossible to trace the small irregular passage they make from one spot to another.

I doubt very much the real value of the possible parasites on the termite as aids in combatting it. My experience has always been that these parasites on social insects are far too scanty to make any appreciable impression on the community, nor would it be possible to increase their numbers. Further observations are wanted on the habits of this pest and we shall hope that planters and others will record any that they have an opportunity of making.

H. N. R.

FORESTRY IN INDIA.

A few extract from the review of the Inspector-General of Forests on the Forest Administration in British India for the year 1903–04, may perhaps interest some of the readers of the Bulletin. I think the vastness of the undertaking is made startlingly clear by the figures here reproduced.

To begin with areas, we find that there are 231,701 square miles of forest or a proportion of 24% of the whole area, of which 91,567 square miles consist of reserved or leased forests; 9,865 protected, and 131,269 unclassed.

That is to say that in India reserved forests occupy an area equal to about 3½ times the whole area of the Federated Malay States.

Of this area 63,000 square miles have been surveyed on a scale of not less than 4 inches to the mile, all interior details being shewn on the plans such as contours and streams, however small. The object of this detailed survey is to enable the Department to draw up working plans for the systematic working of the forests on a scientific basis. Without such survey such plans would be impossible. Thirty-three thousand six hundred and eighty square miles have now been brought under regular plans, under which provision is made for the quantity of timber, etc., to be removed for many years to come, the yield having been arrived at by exhaustive and laborious work in counting and classifying the trees in such reserves and by ascertaining their rate of growth.

We find that the length of artificially demarcated boundaries of reserves is 121,501 miles.

As regards the important question of forest survey we find that ₨.495,401 was spent during the year on this work and there is a large Department called the Forest Survey Department, at work every year. They form a branch of the survey of India, under the general direction of the Surveyor-General. The Department spent ₨.170,619 on roads and bridges during the year and ₨.113,594 on repairs to the same.

Turning to the output we find that 57 millions cubic feet of timber were extracted from the forests during the year, and 117 million cubic feet of fuel, 184 million bamboos.

The gross revenue was ₨.22,216,747 and the expenditure ₨.12,166,747 giving a surplus of ₨.10,049,754, the proportion of expenditure to gross revenue being 55 per cent., the lowest percentage in the history of Indian forest management and the highest revenue. This works out at ₨. 95 gross revenue per square mile.

There were 8 imperial and 14 provincial forest officers engaged in bringing the forests of native States, British Colonies and foreign countries under regular systematic management, and the Inspector General says that the increasing demand for professionally trained forest officers seems to show how quickly the Governments of Native States are realizing the benefits that are likely to accrue from the introduction of sound methods of control and management.

Under experiments we find that Hevea Braziliensis has proved unsuited to the climate of Bengal. In Burma the rubber plantation extends over an area of 1,749 acres. The species under observation are Hevea Braziliensis, Castilloa elastica, Funtumia elastica and Mimusops balata, Dichopsis gutta (Taban) Willoughbia firma and

Ficus elastica. Thus we see that this plantation is in reality experimental. This plantation is situated in Mergui the southernmost district of Burma where the climate resembles that of the Federated Malay States. Further North the climate is totally different with a dry season of 6 months. The value of exports of forest produce amounted to about 44½ million rupees, lac contained to be the most important article of export which is I think, surprising. Teak comes next in export value.

A. M. BURN-MURDOCH,
Conservator of Forests, F. M. S. and S. S.

PASPALUM DILATATUM.

LARGE WATER GRASS.

An article appears on this fodder-grass in the Kew Bulletin No. 1, 1902, (published in April, 1906). This valuable fodder-grass is a native of Brazil, Uruguay and Argentina. It is widely distributed over the Gulf States of North America and was introduced by Baron von Mueller into Australia in 1892. It has since spread over the country and is considered one of the best fodder-grasses in Australia. Later it was sent to India where it has done well in parts. It is also cultivated in Natal and New Zealand. It is found also as a weed of cultivation in Porto Rico, Mauritius and the Straits Settlements according to the editor of the Kew Bulletin, but I cannot say I ever met with it in the Straits Settlements, before its introduction a few years ago.

Seed was obtained on several occasions at the Singapore Botanic Gardens but failed to germinate ; Mr. ARDEN however, was more lucky in the Experimental Station at Batu Tiga and succeeded in introducing the plant which grew luxuriantly on the clay banks of that Garden. Plants were brought thence to the Botanic Gardens at Singapore and eventually established there. An attempt was made to combat Lalang with it but with no great success, probably under other circumstances it might be effective.

In Singapore it grows fast and well, forming large clumps very soon.

The peculiar thing about it is that it seems to thrive under the most diverse conditions. It is valued in Australia for its drought resisting powers. It thrives best in rich moist soil, and in West Australia it flourishes on poor mountain soil. It stands frost if not continuous well, and is equally happy in the damp hot region of the Malay Peninsula. It will stand sandy soils, even with a considerable proportion of salt. It will grow well in our alluvial flats and on the yellow clay so common over large areas of the Peninsula.

As a pasture grass it has a great reputation. " There is no part of it from the crown to the head that stock will not eat ". It has great milk producing properties. Its analysis compares very favourably with that of English hay. On Richmond river, N. S. W. Government Farm it gave in one year in three cuttings—28 to 31 tons of fodder per acre. The amount of pasture land in the Malay Peninsula is small and cattle-farming is in a very rudimentary state. The poverty of the milk supply especially near our big towns is striking, and the difficulty and expense of procuring milk is perhaps one of the causes of the great infant mortality of the towns. The Kling cattle which supply the milk of the poorer classes, are mostly fed on roadside weeds and rubbish, which cannot be expected to produce good or abundant milk. The chief horse fodder is derived from the grasses *Isachne australis* and *Leersia Oryzoides,* slender narrow leaved water grasses, but the supply of these is limited. In Pernambuco, Brazil every garden has its grass patch for the horse fodder from which a cooly cuts a sufficient supply each day. The grass I saw there was *Panicum numidianum*, a good fodder grass which has long been introduced here and occurs as a weed all over Singapore. Guinea grass (*P. maximum*) has also been often grown for horsefood, but it has rather gone out of favour in consequence of its having when given in quantity occasionally caused the death of the horses, apparently from colic. No such accident has been charged against the *Paspalum* and it might be well worth the attention of planters and others interested in cattle to plant this grass with a view of improving their own and also the local breeds of cattle.

H. N. R.

THE GROWTH OF THE RUBBER TRADE.

Sir,—In your article on "Growth of the Rubber Trade" published in the Financial and Commercial Supplement of the *Times* of February 26, you state that the estimated production of rubber in the year 1905 amounted to 65,000 tons, of which Brazil produced 34,000 tons, or rather more than half of the total production. You also state that the area of rubber plantations to date is estimated at about 150,000 acres, an area which is rapidly increasing. On the strength of these data you express the opinion that the activity in planting in various parts of the earth makes the outlook less promising for the shareholders in new rubber growing companies, as the supply will over-reach the demand.

I have had to do with the supply of rubber in my official capacity in India, and I have watched the development of the industry for many years. My experience has taught me two things—(1) that the natural sources are rapidly diminishing, and (2) that supplant the natural sources we require not less than 800,000 acres of plantations. As regards the first point I can, unfortunately, not bring direct evidence referring to Brazil, but the following data regarding British Colonies may prove interesting to your readers:—

Production of rubber in 1896—12,457,187 lbs.
Do. 1904— 5,055,460 ,,

This represents a falling off amounting to 60 per cent.

It is my belief that the natural sources are being rapidly worked out. Owing to the natural rubber trees and plants being scattered over enormous areas, it is impossible to insist on a national treatment of the trees, and they are sure to disappear everywhere within a limited space of time. Hence future supplies must depend on plantations.

Referring now to the second point, I am confident that to yield permanently a ton of rubber per year requires not less than ten acres of plantation. Hence to supply 65,000 tons a year, we require 650,000 acres of plantation; or allowing for some increase, 800,000 acres. There is plenty of room for further extensions.

The danger connected with this industry is the possibility of an efficient substitute for rubber being discovered.

Oxford. W. SCHLICH.

Most of the statements in this letter have been referred to over and over again in this Journal, and there is little need to go into them here. In my opinion Dr. SCHLICH arrives at a correct conclusion. The only portion of the letter to which I must take serious objection is the part referring to yield of rubber per acre. "To yield permanently a ton of rubber per year requires not less than ten acres of plantation." It is now well known that trees of, say, 10 to 16 years of age, in suitable soil, etc., will give an average of 5 lbs. per annum. Taking the number of trees per acre at 135, this gives a yield of about 6 cwt. of rubber per acre. One ton per 10 acres equals 2 cwt. per acre.

The India Rubber Journal Vol. XXXI, *p. 342.*

GROWTH OF THE RUBBER TRADE.

A Reply to Dr. Schlich.

To the Editor of the "Times".

Sir,—I consider it only as fulfilling a duty in writing to caution the public that no importance whatever should be attached to the entirely misleading figures given in Dr. SCHLICH's letter, printed on page 94 of your "Financial Supplement" of March 12th.

In the interest of those holding shares in tropical rubber companies I give the flattest possible contradiction to his statement "that to yield permanently a ton of rubber per year requires not less than ten acres of plantation," or that "to supply 65,000 tons a year we require 650,000 acres of plantation." Previously to Dr. SCHLICH leaving India, in 1885, only the rubber from the *Ficus elastica* was collected and exported; and if any rubber plantation then existed at all in India it was only of that particular sub-tropical kind (indigenous to Assam and Upper Burma), and not the Para or Brazilian rubber yielded by *Hevea Braziliensis*, and now cultivated largely in our tropical possessions (Ceylon, Malay States, Borneo, etc.).

I do not think Dr. SCHLICH can possibly ever have seen a tropical *Hevea* rubber plantation worked on any commercial scale. In 1903 I inspected and reported on one not yet fully mature, but the produce from which has been valued at 6/2*d*. per pound in London during this last month (February, 1906), and I can, therefore, perhaps claim to speak with somewhat more of personal knowledge than Dr. SCHLICH of the matter at issue.

The yield per acre must, of course, depend on the climate, soil, number of trees per acre, and skilful care in cultivation, management, and tapping. Such plantations should only be formed on high class alluvial soil in any case, but the number of trees that may be most advantageous per acre may vary greatly in different localities. Assuming the trees to stand about 18 feet apart when in full bearing (*i.e.* each tree having a growing space of 18 x 18 = 324 square feet) there will be 135 trees per acre. Now, experiments in Ceylon and elsewhere have shown that mature trees can yield upwards of 51 lbs. of dry rubber per annum; and on a basis of 5 lbs. this would give 135 x 5 = 675 lbs., or 6 cwt., of marketable rubber per acre. Diminish this by one full third, to eliminate risk of over-estimating—33 1-3 per cent. seems a very ample margin—and the yield will still be 4 cwt. per acre, or twice as much as Dr. SCHLICH says can be produced, because 10 acres for 1 ton equals only 2 cwt. per acre.

As this is a matter of great importance commercially I am quite willing to argue it out fully with Dr. SCHLICH—only I must first know if he has ever seen any large tropical plantation of *Hevea Braziliensis*, and, if so, where and when, because this knowledge will be necessary both to me and to the public in such a controversy.

(Signed) J. NISBET,
Formerly Conservator of Forests,
BURMA.

NICE, *March* 14*th*, 1906.

A WARNING TO PLANTERS.

(THEFTS OF RUBBER SEEDLINGS.)

Planters would do well at the present time to keep an eye on their rubber-nurseries. The demand for plants and seeds especially for Dutch territory is so large that it has become worth while for Malays to raid plantations by night and convey the plants to Singapore whence they are shipped to Dutch Borneo. Upwards of a thousand seedling were stolen from the nurseries at the Botanic Gardens one night, and a planter in Malacca lost ten thousand in three raids. Investigations in Singapore disclosed the fact that a very large export of seedlings has been going on from Singapore chiefly to Banjermassin, at the rate of from thirteen to thirty thousand a week. Few if any of these are cultivated by the exporters, most of whom say they obtained the plants from Klang. One man was recently charged with fraudulent possession of 13,000 plants, but was acquitted as the evidence wanted was in the Native States and not procurable. It seems probable that the nurseries are raided by night, the plants pulled up and taken by native boats to Singapore so as to avoid their being seen on board a steamer leaving for Singapore, and then sold to the exporters for shipment.

At one time it was proposed to prevent the export of rubber seedlings from the Malay Peninsula, except to British Colonies—it is regrettable that this was not carried into effect as the supply of plants is by no means large enough for our own requirements, and it would then have been possible to check these robberies.

H. N. RIDLEY.

THE WATER-HYACINTH.

EICHORNIA CRASSIPES.

This beautiful aquatic was introduced here some four or five years ago and has now become a very popular plant among the Chinese. It is usually cultivated for ornament, in a jar of water with charcoal and stones when it will flower if it is allowed sufficient light. The leaves have a swollen fleshy petiole and a round short blade. In too shady a place the petiole gets much longer and less swollen and the whole leaf is much larger. In this state it does not flower so well. It grows by offsets from the base and with surprising rapidity, and will fill up a pond very quickly, if the place suits it. From this habit it has proved a great nuisance in Florida and Australia choking up the rivers so that steamers could not pass. In Brazil it usually grows in damp water meadows which are almost dry at times but when flooded the suckers of the plant drift off by the aid of then swollen petioles and are carried far off by the water and deposited at other spots where it grows again. It is grown here in some quantity also by the Chinese, in ponds as they grow *Pistia Stratiotes,* and other plants for feeding pigs. The flower-spikes are hawked about in large quantities in Singapore for sale and have become quite a feature in the streets. They are very beautiful and certainly suggest a spike of large pink hyacinths but they are unfortunately but of short duration lasting but a day. Flowers are very seldom sold in the streets of Singapore, and indeed this is the first time that I have ever seen them sold in this way.

H. N. RIDLEY.

NOTE ON AN OLD RUBBER STUMP.

Among the Para rubber trees in the Botanic Gardens stands an old stump of a tree, 9 feet tall and 3′ 11″ in girth. It met with an accident some 15 or 20 years ago and the top got knocked off, since then the stem has gradually died down. Till about 5 years ago it produced one or two shoots with leaves occasionally, which died away as the decay from above reached them, but for above five years it has not borne any leaves at all. The base of the trunk where it is alive, 2 feet high, contains a good quantity of latex and the stem was tapped some few weeks ago and gave 3¼ ozs. of very good and strong rubber. The tree still contains latex. The curious thing is that latex is apparently produced by a tree which has not borne leaves at all for a great many years. This seems to show that the latex in a tree is not produced by the action of the leaves, and that a tree can go on producing latex without them. In another case a tree had been cut down to the level of the ground, after many years was dug up, only one large root remained alive and a small part of the trunk which had long been buried beneath the ground. Here again abundant latex was found in the surviving root. Naturally as long as there is any life in the cambium layer there is some amount of growth going on, and probably latex is being produced as long as growth continues. It is not I think probable that the latex in these two stumps has been preserved in the tree in good condition for 10 to 15 years since the main part of the tree and all its leaves have been destroyed.

H. N. RIDLEY.

FURNACE FUMES AND VEGETATION.

The injurious effects on vegetation of the fumes emitted by the tin ore roasting furnaces have been causing some anxiety in some planting areas in Federated Malay States. In one case a large number of Ficus Elastica trees were practically defoliated by the presence of these fumes. Different species of trees are affected to a greater or less degree. The *Inga Saman* tree of all trees growing in the vicinity of these furnaces is the first to show signs of the ill effects and is most affected. In the case of a large number of such furnaces at Sungei Besi the *Inga Saman* trees are almost defoliated at a distance of more than 2 miles from the chimneys.

The Director of Agriculture has erected in the grounds near the Laboratories a model roasting furnace in order to observe exactly the effects caused on rubber trees and other plants. This furnace will have attached to it a condensing apparatus to extract from the fumes the Arsenic and Sulphur which are the cause of the injury to the vegetation.

J. B. C.

COCONUT TREE PEST.

An outbreak of Nettle grub caterpillars, a species of *Thosea*, occurred on coconut palms in March in Selangor. These caterpillars are of light apple green with bright colored markings and are from

1 inch to 1½ inches long, they have tufts of hairs dispersed over the upper surface, and these hairs cause painful stings if touched.

The moth is of a greyish colour. A careful look-out should be kept for this pest and when one or more are seen they should be at once destroyed and a search made to see if others are on the neighbouring trees. Though in this case the caterpillars were feeding only on the coconut palms many of which they had practically defoliated, yet they will eat the leaves of both *Hevea Braziliensis* and *Ficus Elastica,* and when in captivity greedily fed on these.

J. B. C.

CEARA RUBBER IN SHEETS.

M. FURNISS, the U. S. A. Consul in Bahia having discovered Ceara rubber in Bahia, describes the manufacture of Ceara sheets the best form of Ceara rubber. The preparation as made by an American owning extensive areas in this region consists in collecting enough liquid latex to fill flat pans; then after coagulation, pressing the rubber between flat boards, washing and drying, (nothing unfortunately is said as to the method of coagulation). The sheets are 20 inches long, 10 inches wide and a quarter of an inch thick. The rubber is of good amber colour and smells well and is remarkably elastic. It is quoted on the Liverpool and U. S. markets as equal to fine Para.

Journal d' Agriculture Tropicale, No. 67, p. 93.

LARGE PARA RUBBER TREES IN CULTIVATION.

What is the size of the largest Para rubber tree in cultivation in the East? The biggest specimen in the Botanic Gardens, Singapore, measures 9 feet 5¾ inches at 3 feet from the ground. It is 27 years old.

The largest mentioned in Ceylon in Mr. WRIGHT'S book is 9 feet 2 inches. Are there any bigger than this in the Peninsula?

H. N. R.

FOMES SEMITOSTUS IN CEYLON.

ROYAL BOTANIC GARDENS,
PERADENIYA, *March 12th,* 1906.

DEAR SIR,

I am very much obliged to you for the specimens of *Fomes Semitostus.* I think we are dealing with the same disease though our specimens are red brown changing to pale yellow brown. I enclose a piece of an old sporophore, the edge is thicker than usual.

Yours faithfully,
T. PETCH.

GOW, WILSON & STANTON, LIMITED.

13, Rood Lane, London, E. C.
April 20th, 1906.

At to-day's auction, 242 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which all except about 15 were sold. The total weight amounted to nearly 12 tons, Ceylon contributing 3 and Straits Settlements 8¾.

The market opened after the holidays with good competition for all grades, though in some cases, scrap was inclined to be less firm. The highest prices realized was 6/3 for two small parcels of fine biscuits, the prices generally paid for fine quality sheet and biscuits being 6/2½ to 6/2¾. There were some large invoices from the Straits included in the offerings, and a notable parcel was that consisting of 33 cases of fine washed sheet from Vallambrosa which realized 6/2¾. This invoice also contained 13 cases of other grades, the total weight amounting to nearly 2¼ tons.

Of the Ceylons, a small invoice from the Syston estate had some exceptionally fine pale transparent biscuits which realized 6/3.

Quotations.—Fine sheet, 6/2¾.
Fine pale washed crape, 6/2¾.
Do. darker, 6/- to 6/1.
Do. dark, 4/6¾ to 5/8.
Fine biscuits, 6/2½ to 6/3.
Rough biscuits and rejections, 5/9 to 6/2.
Scrap, fine, 5/2 to 5/3½.
Medium, 4/- to 4/9.
Rambong, 4/6.

Plantation Biscuits and Sheet To-day.—6/2¾ to 6/3, same period last year, 6/3 to 6/6.

Plantation Scrap.—4/- to 5/3½, same period last year, 3/- to 4/10.

Fine Hard Para (South American).—5/4½, same period last year, 5/7.

Average Price of Ceylon and Straits Settlements Plantation Rubber.

227 packages at 5/11¼ per lb., against 100 packages at 5/11 per lb. at last auction. Particulars and prices as follows:—

Ceylon.

Mark.	Quantity, Description and Price per lb.
Ellakande	1 case fine amber biscuits, 6/2¾. 1 case fine palish scrap, 5/3½.
Hetherley	2 cases fine darkish biscuits, 6/3. 1 case fine pale scrap, 5/3½.
Langsland	5 cases fine darkish biscuits, 6/2¾. 4 cases darker, 6/2¾. 2 cases fine pale scrap, 5/3¼. 1 bag scrap and pieces, 4/6.
New Rasagalla	1 case palish to darkish biscuits, 6/2. 1 case darkish scrap, 5/2½. 1 bag rejected biscuits, 5/9.
Rangalla	1 case good cloudy Ceara biscuits, 5/9. 1 case scrappy sheet, 4/-.
Warriapolla	1 case fine palish biscuits, 6/2¾. 4 pkgs. lighter, 6/2¾. 1 bag darker, 6/2¾.

Mark.	Quantity, Description and Price per lb.
Waharaka	1 case palish to darkish cloudy biscuits, 6/2¾. 1 case scrap, 5/-.
Gonakelle	1 case fine pale to dark biscuits, 6/2¾. 1 case fine palish scrap, 5/3½.
Glencorse	1 case fine large palish biscuits, 6/2¾. 1 case fine palish scrap, 5/3¼. 1 case good cuttings, 5/3¼.
Doranakande	5 cases good dark biscuits, 6/2¾. 3 cases fine darkish scrap, 5/3¼. 2 cases very dark scrap, 4/9.
Syston	2 cases very fine transparent biscuits, 6/2 to 6/3. 1 case little darker, 6/2. 1 bag biscuits and sheet, 6/2. 1 bag darkish biscuits, 6/1.
Gikiyanakande	1 case very dark rolled crape, bought in.
Ambatenne	3 cases fine palish biscuits, 6/2½. 1 case darker, 6/2½. 1 case rough biscuits, 6/1.
Upper Haloya	1 case small Ceara biscuits, bought in.
Suduganga	1 case good palish to darkish biscuits, bought in.
Gikiyanakanda	7 cases fine pale worm, bought in.
Madampe	1 case fine amber biscuits, 6/2½.
Hapugastenne	2 cases fine pale to darkish biscuits, 6/2½. 1 case good darkish, 6/2½.
Galatura	1 case good large darkish biscuits, 6/2½.
Katugastota	1 case good palish biscuits, 6/2½. 1 bag unripe ball and pieces 4/4.
Halwatura	2 cases very fine pale clean scrap, 5/3.
Okande	1 case good dark scrap, heated, 4/6. 1 bag fine palish scrap and cuttings, 5/2½.
Degalessa	1 box fine palish to darkish biscuits, 6/1. 1 box good pale scrap, bought in.
Ballacaduwa	1 case fine pale biscuits, 6/2¾.
Nikakotua	1 case fine pale biscuits, 6/2¾.
Rangbodde	1 case fine pale biscuits, paler, 6/2¾.
Elston	2 cases dark biscuits, 6/2¼. 1 case fine scrap, 5/3¼.

STRAITS SETTLEMENTS.

Mark.	Quantity, Description and Price per lb.
S RC	6 cases dark pressed crape, 4/6¾. 10 cases palish, 6/1. 3 cases pressed scrappy sheet, 5/3¼. 2 cases good palish to darkish biscuits, 6/1½. 2 cases pressed scrappy sheet, 5/3¼.
V J Co., L Klang FMS	33 cases fine amber washed scored sheet, 6/2¾. 3 cases fine palish pressed crape, 6/1. 2 cases little darker, 5/2½. 1 case paler, 6/-. 7 cases dark gritty, 4/10 to 5/-.
Cicely	7 cases fine large amber sheet, 6/2¾.
G M S B	12 cases fine amber sheet, 6/2¾. 2 cases fine palish scrap, 5/3¼ to 5/3¾.
KIN	1 case fine amber sheet, part rolled, 6/2½. 1 case fine amber sheet, 6/2½.
TIT	1 case fine scrap, 5/3. 1 bag mixed scrap and pieces, 4/9.
P R S B	4 cases fine amber sheet, 6/2¾. 1 case scrap and scrappy sheet, 4/11½. 1 case scrap, 5/3.
K P C, Ltd.	7 cases large rough palish biscuits, 6/2½. 2 cases pressed scrappy sheet, 5/3. 1 case fine scrap, 5/3. 1 case large palish biscuits, 6/2½. 7 cases rougher, 6/2½. 1 case pressed scrappy sheet, 5/4¾. 2 cases fine pale scrap, 5/2.
Gula	4 cases fine pressed sheet, 6/1¾. 1 case scrappy sheet, 5/3.

Mark.	Quantity, Description and Price per lb.
PSE L E	4 cases fine amber sheet, 6/2¾.
MUAR Straits	8 cases pale to dark crape, 6/2¾. 1 case dark, 5/8. 1 case fine amber washed scored sheet, 6/2¾.
Tiger Asahan Bukit Duyong	2 cases good biscuits, 6/2.
CKC	1 case pressed sheet, 6/1. 1 bag good pale biscuits, 6/1. 1 case good pressed scrap, 5/1. 1 case pressed Rambong scrap, 4/6.
B N B A	3 cases fine pale sheet, 6/2½ to 6/2¾. 1 case fine large pale biscuits, 6/2¾.
B N A	1 case fine pale sheet, 6/2¾.
PS PR	5 cases fine palish sheet and biscuits, bought in.

JAVA PLANTATION RUBBER.

Tjidjerock	1 case fine clean pressed Castilloa sheet heated, 4/-. 1 case pressed Rambong sheet heated, bought in. 1 bag heated Castilloa scrap, 2/-. 1 bag Rambong scrap heated, 2/-.

Singapore.

Abstract of Meteorological Readings for the month of April, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	Ins.	°F	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory... ...	29·892	142·9	81·5	89·5	75·8	13·7	78·7	·913	76·8	79	w.s.w.	5·51	1·27
Botanic Gardens...	...	...	...	...	...	...	...	...	...	...	...	7·63	1·45

A B. LEICESTER,
Meteorological Observer.

D. K. McDOWELL,
Principal Civil Medical Officer, S. S.

Kandang Kerbau Hospital Observatory,
SINGAPORE, 17*th May*, 1906.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of April, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29·906	148·3	83·2	89·6	75·2	14·4	78·7	·922	76·09	81·0	N.	15·47	4·66

PRISON OBSERVATORY,
PENANG, 10*th May*, 1906.

M. E. SCRIVEN,
Assistant Surgeon.

T. C. MUGLISTON,
Colonial Surgeon, Penang.

Malacca.

Abstract of Meteorological Readings for the month of April, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	%	%		Ins.	Ins.
Durian Daun Hospital ...	29·933	149·9	79·4	89·2	70·0	19·2	81·1	1·049	62·8	93	S.W.	8·92	2·25

COLONIAL SURGEON'S OFFICE,

MALACCA, 17*th May*, 1906.

F. B. CROUCHER,

Colonial Surgeon, Malacca.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of April, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping ...	...	155	82·51	94	71	23	78·37	916	...	83	...	17·77	3·34
Kuala Kangsar ...	...	...	80·11	94	71	23	76·54	868	...	85	...	7·94	1·78
Batu Gajah ...	...	157	81·83	94	71	23	77·36	878	...	81	...	12·40	2·65
Gopeng ...	...	...	79·88	94	67	27	76·50	870	...	86	...	11·91	1·76
Ipoh ...		...	81·35	93	74	19	78·03	917	...	86	...	9·12	1·00
Kampar ...	...	...	...	93	71	22	...	...	...	...	..	17·38	2·28
Teluk Anson ...	...	...	81·91	92	72	20	77·83	899	...	83	...	11·13	3·43
Tapah ...	...	...	81·31	94	68	26	77·40	890	...	84	...	14·05	2·05
Parit Buntar ...	...	...	82·61	92	73	19	78·06	899	...	81	...	8·90	2·90
Bagan Serai ...	...	...	82·32	91	70	21	78·44	922	...	84	...	6·16	1·74
Selama ...	...	...	81·49	91	74	17	77·83	905	...	85	...	8·36	1·15

STATE SURGEON'S OFFICE,
TAIPING, 11*th May*, 1906.

M. J. WRIGHT,
State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of May, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·875	147·0	80·8	91·0	72·1	18·9	76·5	0·842	73·6	78	Calm.	9·83	1·62
Pudoh Gaol Hospital ,,	...	...	...	...	...	...	...	...	...	...	...	10·35	1·78
District Hospital ,,	...	...	...	...	...	...	...	...	...	...	...	12·08	2·62
,, Klang	...	...	...	88·4	70·4	18·0	...	...	...	...	...	10·76	2·25
,, Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	7·15	1·70
,, Kajang	...	...	...	91·8	73·5	18·3	...	...	...	...	...	8·05	1·42
,, Kuala Selangor	...	...	...	...	...	...	...	...	...	...	...	9·03	2·10
,, Kuala Kubu	...	...	...	91·4	72·3	19·1	...	...	...	...	...	13·21	2·60
,, Serendah	...	...	...	91·7	69.0	22·7	...	...	...	...	...	14·99	2·98
,, Rawang	...	...	...	87·9	67·6	20·2	...	...	...	...	...	10·55	2·00
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	7·73	1·60
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	...	6·73	1.52

State Surgeon's Office,

Kuala Lumpur, 14*th May*, 1906.

E. A. O. TRAVERS,

State Surgeon, Selangor.

Pahang.

Abstract of Meteorogical Readings in the various Districts of the State for the month of February, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	94·0	67·0	20·03	...	...	...	...	...	3·99	1·36
Raub ...	...	...	...	93·0	66·0	17·57	...	...	...	...	...	4·21	2·77
Bentong ...	...	...	...	93·0	66·5	18·32	...	...	...	...	...	5·61	1·95
Pekan ..	...	...	...	90·0	70·0	13·33	...	...	...	...	...	2·64	1·83
Kuantan ...	...	...	...	94·0	68·0	17·11	...	..	...	...	...	·41	·33
Temerloh ...	...	...	...	92·0	61·0	23·32	...	...	...	...	...	3·32	1·60
Sungei Lembing ...	...	...	...	...	...	...	...	...	...	...	...	...	...

KUALA LIPIS,

15th May, 1906.

W. H. FRY,

State Surgeon, Pahang.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of January, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	91·0	68·0	14·32	...	...	...	...	...	9·59	1·58
Raub ...	...	...	...	91·0	67·0	17·68	...	...	...	...	...	9·49	1·30
Bentong ...	...	...	...	89·5	69·0	11·34	...	...	...	...	...	11·13	1·45
Pekan ...	...	...	...	86·0	71·0	7·55	...	...	...	...	...	40·28	5·70
Kuantan ...	...	...	...	87·0	70·0	12·70	...	...	...	...	...	34·92	5·30
Temerloh ...	...	...	...	95·0	69·0	9·93	...	...	...	...	...	7·19	1·75
Sungei Lembing ...	...	...	...	88·0	66·0	12·80	...	...	...	...	...	44·95	6·10

KUALA LIPIS,

23rd April, 1906.

K. TAMBY,

for State Surgeon, Pahang.

The Duff Development Company, Limited, Kelantan.

Abstract of Meteorological Readings for the month of April, 1906.

DISTRICT.	Temperature.			Total Rainfall.	Greatest Rainfall during 24 hours.
	Maximum.	Minimum.	Range.		
	Mean. °F	Mean. °F	Mean. °F	Inches.	Inches.
Kuala Lebir ..	91·1	72·1	19·0	12·08	2·75
Ulu Liang ...	88·5	73·0	15·5	11·71	1·38
Serasa ...	93·0	71·0	22·0	6·49	1·18
Kuala Kelantan ...	88·1	74·7	13·4	3·46	1·30

SURGEON'S OFFICE,
8th May, 1906.

JOHN D. GIMLETTE,
Surgeon.

METEOROLOGICAL OBSERVATIONS.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the Month of March, 1906.

Date.	Temperature of Radiation.										Wind.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Clouds and weather Initials.			Rain.
											Direction.																	
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference sun and shade.	Grass.	Difference shade and radiation.	9 H	15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	21 H	9 H	15 H	21 H	Inches.
	°	°	°	°	°	°	°	°	°	°			°	°	°	in.	in.	in.	°	°	°							
1	78	86	82	87	71	16	140	53	...	...	S.E.	S.E.	72·9	74·2	73·5	0·810	0·855	0·832	84	68	76·	3	5	2	C	C	B	
2	84	89	86·5	90	72	18	143	53	...	...	E.	E.	70·7	72·7	71·7	·751	·801	·776	64	58	61·	5	5	10	C	C	R	·53
3	83	85	84	86	72	14	137	51	...	...	E.	S.E.	71·3	71·8	71·5	·766	·781	·773	68	64	66·	0	0	0	B	B	B	
4	79	91	85	93	71	22	142	49	...	...	E.	E.	73·9	69·9	71·9	·839	·730	·784	85	50	67·5	0	0	2	B	B	B	
5	82	95	88·5	97	69	28	144	47	...	...	S.E.	E.	72·	69·4	70·7	·785	·718	·751	72	43	57·5	0	0	2	B	B	B	
6	80	81	80·5	82	69	13	134	52	...	...	S.E.	E.	73·3	74·2	73·7	·820	·849	·834	80	80	80·	3	3	10	C	C	R	·12
7	77	79	78	80	73	7	101	21	...	...	E.	E.	73·6	72·3	72·9	·829	·793	·811	89	80	84·5	3	3	5	C	C	C	·05
8	84	87	85·5	88	73	15	147	59	...	...	E.	E.	70·7	72·2	71·4	·751	·792	·771	64	61	62·5	2	5	0	B	C	B	
9	81	90	85·5	91	72	19	146	55	...	...	E.	S.E.	69·3	73·7	71·5	·715	·833	·774	68	59	63·5	0	3	2	B	C	B	1·43
10	82	89	85·5	90	71	19	144	54	...	...	E.	S.E.	72·	74·3	73·1	·785	·847	·816	72	61	66·5	0	3	0	B	C	B	·33
11	79	82	80·5	83	73	10	147	64	...	...	S.E.	S.W.	75·6	75·3	75·4	·888	·877	·882	90	80	85·	3	3	2	C	C	B	
12	82	86	84	87	71	16	146	59	...	...	E.	S.E.	73·6	72·8	73·2	·830	.808	·819	76	64	70·	0	3	2	B	C	B	
13	79	78	78·5	80	71	9	148	68	...	...	S.E.	E.	75·6	74·6	75·1	·888	·857	·872	90	89	89·5	2	10	10	B	R	R	·69
14	79	86	82·5	86	72	14	150	64	...	...	E.	S.E.	75·6	77·	76·3	·888	·955	·821	90	76	83·	0	10	2	B	R	B	·20
15	81	82	81·5	84	72	12	147	63	...	...	S.E.	S.E.	72·6	75·3	73·9	·802	·877	·839	76	80	78·	0	0	2	B	B	B	
16	79	81	80	82	72	10	145	63	...	...	E.	E.	73·9	72·6	73·2	·839	·802	·820	85	76	80·5	0	3	5	B	C	C	
17	81	86	83·5	87	74	13	146	59	...	...	E.	S.E.	72·6	76·	74·3	·802	·904	·853	76	72	74·	0	3	0	B	C	B	
18	81	80	80·5	81	74	7	147	66	...	...	S.E.	S.E.	72·6	76·6	74·6	·802	·916	·859	76	90	83·	0	5	5	B	C	C	·20
19	79	89	84	90	75	15	148	58	...	...	S.E.	S.W.	75·6	74·3	74·9	·888	·847	·867	90	61	75·5	0	0	3	B	B	C	1·27
20	82	92	87	93	73	20	150	57	...	...	E.	E.	73·6	75·9	74·7	·830	·894	·862	76	59	67·5	0	0	0	B	B	B	
21	84	89	86·5	90	74	16	144	54	...	...	E,	S.E.	74·	76·	75·	·840	·895	·867	72	65	68·5	0	3	2	B	C	B	
22	85	94	89·5	96	74	22	142	46	...	...	E,	E.	75·	74·8	74·9	·873	·862	·867	72	54	63·	0	0	0	B	B	B	
23	83	76	79·5	87	75	12	145	58	...	...	E.	E.	74·7	74.3	74·5	·856	·845	·852	76	94	85·	3	3	5	C	C	C	·38
24	83	86	84·5	88	73	15	151	63	...	...	E.	E.	71·3	76.	73·6	·766	·904	·835	68	72	70·	2	10	2	B	R	B	·90
25	83	94	88·5	97	73	24	146	49	...	...	E.	E.	71·3	74·8	73·5	·766	·862	·814	68	54	61·	0	0	2	B	B	B	
26	85	92	88·5	93	70	20	147	54	...	...	E.	E.	73·4	74.2	73·8	·826	·847	·836	68	56	62·	0	3	5	B	C	C	·19
27	81	92	86·5	94	70	24	147	53	...	...	E.	E.	72·6	72·6	72·6	·802	·802	·802	76	53	64·5	0	0	2	B	B	B	
28	82	86	84	87	72	15	137	50	...	...	E.	E.	72·	76·	74·	·785	·904	·844	72	72	72·	3	5	5	C	C	C	·04
29	82	86	84	87	72	15	146	59	...	...	E.	S.E.	75·3	77·	76·1	·877	·955	.916	80	76	78·	0	0	10	B	B	R	·85
30	82	86	84	87	72	15	141	54	...	...	E.	E.	75·3	74·2	74·7	.877	·855	·866	80	68	74·	2	5	10	B	C	R	.56
31	78	90	84	92	71	21	146	54	...	...	N.E.	E.	74·6	75·4	75·	·857	·880	·868	89	62	75·5	0	2	2	C	B	C	

Total 7·74

State Surgeon's Office,
Seremban, 11*th April*, 1906.

R. VAN GEYZEL,
Apothecary.

No. 5.] MAY, 1906. [Vol. V.

AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

EDITED BY

H. N. RIDLEY, M. A., F. L. S.,
Director of Botanic Gardens, S. S.

AND

J. B. CARRUTHERS, F. L. S.,
Director of Agriculture, F. M. S.

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NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, &c. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valua-"tion regarding new or little known natural or manufactured pro-"ducts of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M.A., F.R.S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given.

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

No. 5.] MAY, 1906. [VOL. V.

TAPIOCA AS A CATCH CROP FOR RUBBER.

The question of the practicability of combining the cultivation of Tapioca with Para rubber is again coming to the front, and as there has been a serious falling off in the supply of Tapioca from the Malay Peninsula, with a consequent rise in price, and serious effects on the trade in England, the possibility of using the plant as a catch crop for rubber without injury to the latter is of very considerable importance. Tapioca is accused of causing a great deterioration of the soil. It is considered a very exhausting crop. The extensive areas of land formerly under forest, which having been cleared and planted with tapioca are now mere lalang wastes as one often sees in Malacca seem to endorse the view that land is permanently damaged or rendered useless for other cultivation by the cultivation of Tapioca. In the ordinary method of cultivation of Tapioca on a large scale the forest is felled and burnt, the Tapioca cuttings put in the ground, and from three to five crops taken off the soil, which of course is not manured and then the ground is abandoned. The ground is weeded during the process, and the results are the destruction of any after-growth except lalang, which by constantly catching fire, by accident or intention prevents the recuperation of the ground by the introduction of shrubs and trees, the seedlings of which are destroyed every time the lalang which is practically unhurt by fire, is burnt. Lalang ground which is protected against fire recuperates in a few years, especially if there is forest or secondary jungle near it.

Gambier in the same way as Tapioca has been responsible for the deterioration of areas of country and has also been accused of being an exhausting crop.

The idea in both these cultivations is that the plants in question take something from the ground, necessary to the life of other plants.

It is easy to understand that in removing Tapioca roots or gambier leaves and twigs from the ground, a quantity of plant food is removed and not replaced and naturally in this way the fertility of the soil is diminished. The natural idea of a native cultivator is to go on over the same ground with the same kind of crop till he cannot get any more out of it, that is till he has so exhausted the soil that the plant cannot get any more food out of it. Rotation of crops and heavy manuring as practised in Europe and the United States are quite unknown to the native cultivator.

This working the ground out by cultivation of Tapioca has been reduced by preventing cultivators from taking too many crops from the ground.

Besides injury caused to the soil by removal of the actual salts required for plant-food, tapioca has been accused of poisoning the ground, by leaving something in it which is dangerous to plant-life in general, and the same has been said of bananas. It is easy to understand that a fungus might attack the decaying bits of Tapioca root left in the ground after removal of the crop and then attack the roots of other allied plants which succeeded it. There does not seem, however, to be any evidence that such an accident has occurred, and I do not know that any observations have been made on this poisoning of the ground said to have been produced.

Tapioca is often grown in small patches in gardens and elsewhere where one can more readily watch it, and I have never seen any plants refuse to grow on ground where it has been cultivated in this way.

Can Tapioca be used for say two or three crops as a catch-crop for rubber?

When Mr. H. C. HILL, the Forest Inspector for India was here in 1900, he was very enthusiastic on the subject of cultivating Para rubber through secondary or scrub formation much in the same way as it is necessary to cultivate Gutta percha. He urged that it was a forest tree and should be grown as a forest tree and deprecated the clearing of the soil completely below the trees. He had had of course no experience of Para rubber, as it had always failed in India where his work had lain, but he was very keen on planting it through Tapioca. Mr. CURTIS and I travelling with him came to an estate where this experiment had been tried. One or two trees were showing good growth among the tapioca and he was enthusiastic. Enquiry however elicited the fact that these were the survivors of a considerable number that had been planted, the rest had nearly all died, but a few wretched specimens beside the bigger ones were to be seen smothered by the Tapioca. Mr. CURTIS and I therefore came to a very different opinion from that of Mr. HILL, *viz.*, that the experiment was a dead-failure, as we had expected it would prove.

The next attempts in the same line I saw was in Mr. TURNER'S estate near Caledonia. The cheapness of the cultivation was a good deal in its favour. The soil on which I saw the trees planted was not the best kind of soil for rubber, and as the plants were quite young I could form no safe idea of the value of the system. Recently Mr. TURNER being in Singapore told me that these trees were thriving and doing well, but the growth was not as rapid as under other circumstances. Perhaps some of our readers have seen and can give information about other estates where this system has been tried. Mr. DUNMAN promises to send an account of an estate in which the tapioca is being made to pay the expenses of the estate while the rubber is growing. In Bukit Asahan good results are, it is stated, being obtained, and there may be others.

In the first estate to which I have referred, the tapioca had been allowed to grow too close to the rubber and its rapid growth had smothered many of the young plants. There is no necessity for this. It is easy to keep the ground clear round the young trees so that they can get as much light as they require. There is a risk too of injury to the roots of the rubber caused by digging up the Tapioca. Mr. TURNER, however, I understand has seen no evil results from this risk. Finally it must be remembered that Tapioca is perhaps the nearest relation to Para rubber we have in cultivation here, and there is a possibility of a pest fungus or insect, accustomed to prey upon the Tapioca which might transfer its attentions to the rubber plants. However, the Tapioca cultivation is not intended to last for more than a few years, and it is probable that owing to the shortness of time it is on the ground such an accident could be avoided.

The subject is one of the greatest importance. A good catch-crop for rubber is badly wanted, the supply of tapioca has fallen off and there are complaints from England, as to its insufficiency. If it is possible to combine the two cultivations the results would be of the greatest value. We want, however, more information on the subject.

H. N. R.

CEARA RUBBER.

By J. C. CAMPBELL.

In the February number of the Agricultural Bulletin, Mr. STRICKLAND makes some enquiries *re* Ceara Rubber, *Manihot Glaziovii*, and in paragraph five of his letter asks "Do you think that tapping 'Ceara' must necessarily kill the tree? and do you know of, or have you heard of cases where 'Ceara' trees have been tapped without damage?" In the latter part of last year I tapped about 60 trees of "Ceara" at Kuala Kangsa and Batu Gajah, the yield per tree was about 1½ lbs. The average girth of the trees 36 inches. The method of tapping employed was herring bone, each tree was tapped fifteen times, the work being done on alternate days. The trees it will be seen were not heavily tapped, but the yield was fair for the girth.

The trees are now all quite healthy and the tapping scars all healed up, neither during or after tapping operations did the trees show any bad effects.

It would be hard to say why Mr. STRICKLAND'S trees all died under the operation, it may have been that the method of tapping employed was too severe, and the trees were unable to recover from the shock; or the wounded surface may have been attacked by a fungus. One who had seen the trees would be able to form a much better opinion as to the cause.

After the outer rough bark has been stripped off, the inner bark remaining is very thin, compared with that of Para, and consequently much greater care is required in tapping or the cambium is bound to be injured.

The latex of "Ceara" is treated in the same way as that of "Para" and the rubber to all outward appearance is as good.

The outer rough bark of "Ceara" can be stripped off at all seasons of the year in the Malay Peninsula without any apparent injury to the tree. But in India where long droughts are experienced it might not perhaps be wise to strip it off during the very dry season, as the dry air and hot sun might have some injurious effect on the tender bark freshly exposed.

The "Ceara" is not a tree for the Malay Peninsula. It does well in a young state and up to 20-25 years, when it begins to show signs of decay and in a year or two dies right off. I do not know why this should be, but have heard it suggested that the excessive rainfall of the Peninsula does not suit it. One of the oldest trees at Kuala Kangsa is now going off in this way. It carries very few leaves and those on the tree look sickly, and good portion of the trunk on one side has decayed. In previous cases where this decay of old trees was noticed the trees had never been tapped.

J. W. CAMPBELL,
Superintendent Govt. Plantation,
PERAK.

ANALYSES OF RUBBERS.

A number of specimens of commercial rubbers were analysed by Mr. D. SPENCE and the results published in the Quarterly Journal of the Institute for commercial research in the tropics of Liverpool University (No. 2 p. 75). The samples were crude and had undergone no treatment before analysis. The method of analysis was to cut up the rubber very fine and dry it in an air oven over Calcium chloride at 55c. until constant in weight. It was then extracted with acetone and the extract dried and weighed. The residue again dried and digested with chloroform till complete solution of the caoutchouc took place, after being allowed to settle till the coagulated proteid had settled out, the chloroform evaporated and the caoutchouc dried and weighed.

Three samples of Para rubber were analysed.

	Moisture.	*Resin.*	*Rubber.*	*Residue.*
	—	—	—	—
Para Hard Cure ...	14·30	2·73	71·09	11·71
Ceylon ...	0·53	3·93	90·38	5·03
Gold Coast ...	0·27	2·31	93·92	3·30

The resins from Para Hard Cure and from the Gold Coast were soft and oily, those from Ceylon hard and glue like. The residues of the Ceylon and South American rubbers consisted of "insoluble" rubber; that from the Gold Coast sample largely fibrous material and very little insoluble rubber. The American rubber is as will be noticed very wet and contains more than twice as much insoluble rubber than either of the other two. It was far the wettest of any of the rubbers analyzed. Only one sample of *Ficus elastica.* was analyzed, from Rangoon. It gave moisture 0·58, Resin 6·81, Rubber 84·63. Residue bark with a small quantity of insoluble rubber, 8·16, Resins hard but not amorphous. Four samples of *Funtumia elastica*, and two probably from that tree vary a good deal in proportions of rubber from 67 to 80 per cent but the lowest sample was wet, 10·90 per cent. One sample of the root rubber *Landolphia Tholloni*, comes out well with 7·02, Resin 83·00 Rubber, 7·74 residue chiefly fibre. Possibly there is more to be done with this plant than one naturally expects.

One of the other *Landolphias*, *Ficus Vogelii* and *Mangabeira*, *Hancornia speciosa*, finish the analyses. The latter is very poor with only 58·75 per cent of rubber.

Perhaps the most interesting point is the difference in the quality of the resins in Ceylon and Gold Coast Para. Those of the latter resembling the resins of the American rubber.

In the same journal there is an article on the effect of various atmospheric conditions on the resin content of rubber by Messrs. DRABBLE and SPENCE. The resins seem to increase with temperature and moisture. The article is only a preliminary one, and investigations are being pursued. The subject has a great importance in the matter of methods of preparing and drying the rubber.

H. N. R.

RUBBER NOTES FROM CONSULAR REPORTS.

French West Africa.—The chief rubber supply in Senegal and French Guinea is derived from species of *Landolphia*, and in 1904 the exported rubber known as Sudan niggers fell in price owing chiefly to adulteration. In 1905 however, the Inspector of Agriculture who had spent two years in visiting the European rubber markets, got an ordinance passed, to suppress adulteration, preserve existing rubber plants create new plantations and also found schools for instruction in methods of cultivating and gathering rubber. The first result of this was to produce a rise in price of rubber, of nearly

2 francs a pound. Several hundred thousand young *Landolphias* were planted. The only practical way being found to be to sow the seed at the foot of the tree up which it was destined to climb. Cuttings and sowings in nurseries for transplanting did not give good results. A small number of *Heveas*, and about 3,000 Castilloas were planted. Ceara seems however to do best in most places. From Ceara trees six years old an average yield of about ⅓ lb. rubber was obtained. Five rubber schools were started and the rubber collected by them is used to defray the school expenses. Two men were sent by Sir WALTER EGERTON, from Nigeria to learn the methods of cultivating and preparing rubber.

New Caledonia does not appear to be a very suitable place for rubber. A certain quantity chiefly from the Royalty Islands was obtained from "wild banian trees." There was a feeble attempt to introduce the planting of the better sorts but it came to nothing and Mr. Consul BROPHY, doubts there is enough moisture to make it pay. The price he says has been good; 3*s*. to 4*s*. a pound according to quality.

THE OLD RUBBER TREE AT PENANG.

This tree was tapped again in 1905 and produced 4 lbs. 12½ oz. fairly dry rubber. This makes the 10th consecutive year of tapping and raises the total production to 31 lbs. 9 oz. The tree which is planted on very poor ground was figured and described in Bulletin 1902, p. 384, Plate V. It was planted in 1886 so that it was 19 years old last year. Its yield is apparently steadily increasing yet, as this is the greatest account it has produced in one year. In 1905 it was tapped in December. In Mr. CURTIS, account of its yield (l. c. 385) it will be noticed that it gave less in April and May 1899 than it did in November–December, 1898, and that in August–September, 1901, less than in October–November, 1900. This rather confirms the theory that the best returns are always at the end of the year. The average therefore of the yield of this tree for 10 years has been a little over 3 lbs. per annum. It is tapped with the simple herring-bone cuts only, and in 1905 was only cut 14 times. This might have been carried on considerably longer, as the last tapping gave 8 oz. rubber, and the yield would have been yet higher.

H. N. R.

LARGE CEARA TREE IN INDIA.

A planter writes to the "Indian Planting and Gardening, April 28th, 1906." Your planting reader may be interested to learn that a Ceara tree planted about 25 years ago on a coffee estate (about 4,000 feet above sea level) on the Shwaroy Hills measured 78 inches around the trunk at three feet from the ground. I think this will be hard to beat elsewhere in India or Ceylon. This is certainly very good growth, and augurs well for the cultivation of this tree in Southern India.

H. N. R.

RUBBER EXHIBITION IN CEYLON.

The Rubber exhibition to be held at Peradeniya in Ceylon from the 13th to the 27th September next ought to be an interesting one. All kinds of things connected with rubber, samples of all kinds machinery, etc. will be shown. It seems however a pity that the exhibition should not be held in Colombo where it could be seen by the travelling public who are passing through the port and who would be unable to get inland as far as Peradeniya. Entries are to be made to E. B. DENHAM, Esq., Secretariat, Colombo, before July 31.—*Editor.*

NEW PAMPHLET ON RUBBER.

A Compilation of Notes on India Rubber and Gutta Percha

BY CAPTAIN G. O. AHERN,

Director of Forestry, Manila.

This little pamphlet of 40 pages consists of a variety of extracts from the India Rubber World, India Rubber Journal, Encyclopœdia Britanica and a few other sources. It is in no sense an up-to-date work on rubber planting. The notes are collected, says the author, after a number of requests had been made to him for information on the market and prospects of rubber in the Philippines, and the notes may be useful to would be planters in the Philippines. No information however as to trees in the Philippines is given. An account of the licence system for jungle produce and a statement of how public land may be acquired will be useful to those who either engage in the trades of wild rubbers and gutta perchas or intend to take up land. An extremely poor list of the really enormous literature of India Rubber ends the pamphlet. And a map of the islands is added showing the distribution of Gutta Percha chiefly in Mindanao, and India Rubber chiefly in Mindoro, which is probably (Lat. 13) too far north for Para Rubber. The best chance for it would be the extreme south.

H. N. R.

TAPPING METHODS.

Under the heading "Careful tapping in the Amazons valley" *Weekly Times* of Ceylon, May 18, p. 12, is given an account of an interview with Mr. WICKHAM who condemns the herring-bone system of tapping which he calls drastic and barbarous, in favour of the Brazilian system of single taps. He saw he says great V cuts leaving a huge wound in the bark in Singapore, and great knobs and warts on the bark. How can you tap over these he asks? Presumably he refers to the Botanic Gardens trees, the only ones tapped I think when he was here. There were I think two or three trees tapped once with the simple V as an experiment, but perhaps he refers to herring-bone tapping in this way. There are plenty of trees which have been tapped on and off for 12–15 years with the herring-bone method and there is no trace of the cuts on the bark. Even in later tappings there is as little roughness as could be expected from any kind of cut. There are a number of trees certainly covered with knobs and warts and with very rough bark. These are the trees tapped in the Amazonian method recommended by him. The injury to the bark and the small amount of latex obtained by this process was the reason for abandoning this system, which is perhaps suited to the ideas of the natives of the Amazons, but we have got beyond native methods a long time ago and need not return to them.

His doubt as to the continuity of yield under the spiral system so much wanted in Ceylon is certainly verified. It is being given up everywhere by the Malay planters who have tried it, and has been practically a failure here. Up to date no one has shown a better all round method than the herring-bone down to the wood, either for yield or inflicting no permanent injury of any kind on the tree.

H. N. R.

AGRICULTURE IN THE SEYCHELLES.

An interesting Colonial report on the Seychelles with an account of the progress in Agriculture, by M. DUPONT has just been published. M. DUPONT was deputed in 1902 to make a tour in the East to collect information on the Agriculture of the East. The Seychelles Government revenue depends apparently mainly on its Agriculture, and the fall in price of vanilla, its staple crop, and the unprecedented drought last year caused a shortage of 16 per cent. on the estimate and a heavy retrenchment, which included apparently the destruction of the experimental plantations at Capucin, and retrenchment of the Botanic Station. The Botanic Station vote is 6,000 rupees per annum or 1–5 per cent. of the expenditure of the Colony. This is by no means a large expenditure in proportion, though very much higher than that of the Straits Settlements which is but ⅓ per cent. Besides Cocoa, Coconuts oil and copra and soap made of coconut-oil and vanilla the exports of the islands are a little salt fish, tortoise shell and guano, so that practically the islands depend on coconuts and vanilla.

It was high time that some development of agriculture should take place when M. DUPONT was sent to the East to see what could be done.

The coconuts are so liable to the attacks of pests that M. DUPONT says it is a surprise to find a tree which is not diseased. Three beetles, a *Calandra*, *Melitorumna insulare* and the well known Rhinoceros beetle *Oryctes rhinoceros* play havoc with them, and there seems to be an obscure disease also possibly fungal, which is injurious. M. DUPONT has introduced a number of Ceylon nuts, and is taking steps to combat these diseases.

Most kinds of rubber trees of value have been introduced, and of these curiously Para Rubber seemed to stand the drought better than Funtumia, Ficus, Castilloa and even Ceara. Funtumia is not attacked by caterpillars as it is here and ranks next to Para in value. The others grow slowly. Para of 2 years' old, measure 17 feet in height with a circumference of 10 inches.

All the rubber seedlings available were bought by six planters, at the price of 15 cents each. The total number of plants in the Seychelles exceeds 8,000 seedlings. More seed was introduced from Ceylon, 97,400 being received but took two to three months to arrive. The delay had little influence on the case of Para Rubber packed in charcoal, and on a tin of the same seeds "packed dry", 2,600 plants were raised from the case of 10,000 seeds which were at sea for 2 months and 400 from the tin of 2,000 seeds which took 3 months. Of the rest only half a dozen germinated. This does not appear to be a very successful shipment.

RAMIE.

A VAST INDUSTRY OPENING.

FORTUNES FOR PLANTERS. THE TEXTILE OF THE FUTURE.

DEAR SIR,—At last the merits of this wonderful fibre are becoming known. The Government has at last issued a bulletin recommending its cultivation, though I doubt if it will get beyond the pigeon-holes of the Bureaux of those to whom it has been sent, and it will still be left to the individual to make it known.

I am pleased to see also our Agricultural and Horticultural and Botanic Societies, Technical Colleges, and Chambers of Commerce are alive to its merits. Special praise is due to that most up-to-date, painstaking and perservering, though very young Institution, the Liverpool University. This admirable Institute of Commercial Research is making the claims of Ramie, the king of fibres, known to our Empire.

It can be grown in most of our Colonies. If Ramie were produced in quantity cotton and flax crises would be banished. It would be universally used if supplies were forthcoming. There is no fear of overstocking the market; the trouble is, those who could and would use it are prevented starting owing to absence of supply. There are fortunes for planters.

There are to be two exhibitions here in London, June and December this year, to advance and exploit Colonial produce. Here is a grand opportunity to exhibit Ramie (Rhea). If any of your readers have experimental patches of Ramie (Rhea) I would suggest they send samples to me.

1st.—Cut a dozen stems as long as possible with all sides shoots, leaves, etc., etc. *Dry thoroughly in the sun before packing.* If too long for post double up but do *not* cut in pieces.

2nd.—Strip from other stems about one pound of ribbons—as peeled from the stems. Dry thoroughly in the sun before packing,

3rd.—Strip, say, another pound of ribbons, but whilst in a green or fluid state scrape off the pellicle or brown bark, and remove some of the gum. This is easily done by drawing the ribbons through the thumb and finger, on which fix a piece of hardwood or bamboo; or draw the ribbons over the edge of a piece of board. Rinse in a little water and thoroughly dry.

If any growers of Ramie will send me these small samples carriage paid, I will first test and furnish them with a report as to the fibre gratis. I will also, *free of expense* to the grower or sender, exhibit his specimens at one of the exhibitions.

I cannot too strongly impress on all who send specimens to be sure all is well dried before packing. I am most anxious to help to introduce Ramie, and I should be glad to know the names and addresses of all who in your Colony are willing to co-operate in introducing the industry. To those who know nothing of Ramie, I shall be pleased to send a pamphlet gratis on the cultivation of Ramie, and I recommend every planter to experiment—it can be done for a cost of five or six shillings only. In the hope you will help to introduce what may become an enormous industry to your Colony, I will thank you in anticipation. Floreat Ramie!

D. EDWARDS-RADCLYFFE,
Staines, England.

The cultivation of Ramie not only means an agricultural industry, but also the possibility of a manufacturing industry following.

VACUUM DRYER FOR RUBBER.

H. N. RIDLEY, Esq.,
Director of the Gardens,
SINGAPORE, F. M. S.

DEAR SIR,

I am enclosing an illustrated description of the Passburg Vacuum Drying Chambers, which are extensively used in Rubber

Works for the drying of India Rubber over 20,000 tons per annum of the wet rubber being now treated in the Vacuum Chambers.

A few months back a chamber of No. 3 size which receives about 120 lbs. of wet rubber per charge was supplied to the Bukit Rajah Rubber Co. This chamber is at work successfully, the manager reporting that the sheets or biscuits are dried in the Vacuum Chamber in about 2 hours. Some samples sent to London are favourably reported upon; a consignment of vacuum dried sold in Singapore, I am informed, secured the top price. The vacuum dried rubber is of a slightly lighter colour than when air-dried.

The Rubber sheets or biscuits or washed rubber towels as the case may be are placed in equal quantities upon perforated trays which are put between the heating shelves of the drying chamber. The swing-hinged door closed, and the small air pump set to work, to evacuate the chamber, for the first few moments the pump requires about $1\frac{1}{2}$ horse-power but in 4 or 5 minutes when a vacuum of 28′ and upwards is secured $\frac{3}{4}$ of a horse power suffices for the pump. In the case of the Bukit Rajah plant, the air pump is fitted with a steam cylinder of $4\frac{5}{16}$ dia. × $6\frac{5}{16}$ stroke and when the steam has driven the pump it is passed to the heating shelves of the drying chamber and effects the evaporation. This is a most economical system of working, practically doing away with the fuel bill for drying purposes, as the steam used is so little as to be scarcely appreciable.

When the wet Rubber reaches 90° to 100° F., then on account of the atmospheric pressure having been removed, evaporation sets in most rapidly and the rubber remains at this low temperature for a considerable time, rising slowly towards the completion of the drying which takes about two hours as I am informed by the Bukit Rajah Co., for their Rubber biscuits. In the Rubber factories with washed Rubber the time is from $1\frac{1}{4}$ to $1\frac{3}{4}$ hours.

In the vacuum chamber owing to the low temperature and the absence of air with its oxygen the wet surface of the warm rubber does not become oxydised as happens with air-dried rubbers.

In the Rubber factories the difference is very marked, the washed Rubber sheets from the ordinary drying room being quite hard, whilst the same sheets vacuum dried remain soft and pliable and of a lighter colour.

The vapour arising from the drying rubber passes to a small surface condenser, where the moisture is condensed and collected, the air pump being a dry one. The condenser is also fitted with a patented arrangement of Mr. PASSBURG'S by which it can be told when all moisture has been removed from the material in the drying chamber.

The space occupied is very small.

Next to Rubber Works, these chambers have been most largely used in explosives works, about 100 having been supplied for the latter works.

The Lanadron Estates and the Singapore and Johore Rubber Co. have also been supplied with a No. 3 size of chamber which has recently got to work, and is proving an acquisition for the drying of gambier.

Chambers of large size No. 9 are at work in the Cameroon, drying cocoa beans with first rate results as to colour, flavour and economy of drying. They are also in use for tea in Assam.

I have troubled you with a long letter, but as the drying of the rubber, gambier and other materials must necessarily be rather an important matter with a humid climate such as I understand you have in the Malay States, I hope the matter may be of interest.

Under separate cover I am sending you printed matter shewing some of the various trades and materials for which vacuum drying is replacing the drying rooms hot air stoves, etc.

If there should be any information you would like I will be glad to send it to you.

Mr. PASSBURG has an experimental station in Berlin where he is continually making drying experiments on materials from all parts of the world.

Yours truly,
JAMES LIVINGSTON,
EMIL PASSBURG, BERLIN.
30, Great St. Helens,
LONDON.

UNITED PLANTERS' ASSOCIATION.

REPORT

FOR

1905.

United Planters' Association, F. M. S.

REPORT FOR 1905.

GENTLEMEN,—Your Committee have the honour to submit for your consideration the Ninth Annual Report of the United Planters' Association, F. M. S.

Meetings.

During the year six meetings were held, of which five at Kuala Lumpur and one at Seremban.

All Meetings were fairly attended, although it is regrettable that owing to the nature of the Association's constitution, all Members have not been able to be kept as thoroughly in touch with the conduct of the Association's business as could be wished.

The Chairman.

The Association has sustained a great loss through the departure of Mr. W. W. BAILEY, your chairman for the past three years, who always took the greatest interest in the Association, and whose services both in his public and private capacity were at all times ungrudgingly given to all Members. In many ways he has, as your Committee are aware, been of the greatest assistance in the correspondence and necessary interviews with Government. His departure for Europe, and retirement from active management took place earlier than was expected and we were only able to express to him in a small measure our regard and appreciation for his services.

Labour.

Of all the various points taken up by the Association during the year, the to all Members by far most important has been the question of Labour. We are glad to be able to report to you that the free ticket system, as introduced by His Excellency the High Commissioner (details of which appeared in our last Annual Report) has proved an unqualified success and of the very greatest assistance to all concerned.

It is to be regretted that many Members did not in time make use of all their tickets last year, nor returned them to the Secretary, with the result that these tickets were unfortunately forfeited. This is all the more regrettable, as the returns supplied by the courtesy of the Superintendent of Indian Immigrants show that the number of free coolies actually brought in were far in excess of the number of free tickets granted to the Association and we sincerely trust that in future all members will take full advantage of these free tickets.

According to the Superintendent of Indian Immigrants, the number of coolies on Estates has increased from 6,069 at the end of 1904 to 9,672 at the end of 1905. The proportion of women is satisfactory. Returns recording 87 births were sent in, but there must have been considerably more not recorded.

The returns sent in show that in Negri Sembilan 1,038 coolies were imported from India and 200 recruited locally ; that there were

40 deaths and 155 cases of desertion. In Selangor 5,002 coolies were imported from India and 402 recruited locally; 241 coolies died and 1,091 deserted.

The ratio of deaths is 27·66 per mille of the average population in Negri Sembilan, and 37·27 in Selangor. If the ratio is taken on the actual number of coolies who passed through the estates,—the fluctuating population—it works out at 17·55 and 22·83 per mille respectively.

The Superintendent took the average of work done by coolies on 35 estates and found that each cooly worked on an average of 21·11 days out of 26 working days in a month. He considers this an excellent average, as indeed it is, and one which tends to show the healthy conditions, under which the coolies work.

What great number of coolies however are still required, will be easily seen by the fact that during 1905, 278 licenses were issued in Selangor alone, the number of coolies authorized to be recruited being 11,346 whilst up to the middle of March, 1906, already 221 licences have been issued to recruit 9,722 coolies, and with the extensive openings in contemplation, at least twice that number will in all probability be applied for.

Whilst we fully appreciate the action of Government in recognizing the previous disabilities under which we worked, we sincerely trust that though these difficulties have largely been met; Government will be able in future years to continue this free ticket system, for it must not be forgotten that every additional cooly brought into the country is an added source of revenue and wealth. Large capital has been introduced in the past few years and far more is still likely to be attracted, and we confidently appeal to Government to continue their assistance.

Labour Ordinance.

The working of this Enactment has given rise to very great dissatisfaction in all planting circles. Under its provisions it has been found impossible to obtain any redress for absconding coolies as the only penalty to free labourers for absconding is forfeiture of wages, which if the cooly is already under advances as is usually the case is nil, as there are no wages due.

The omission of any adequate penalty for absconding as far as Free Tamil Agricultural Coolies are concerned, seems all the more extraordinary, since under the Chinese Agricultural Labour Enactment a fine of $10- or imprisonment of 6 weeks is provided for.

A similar cause for Indian Agricultural Free Labourers would almost seem to have been only accidentally omitted from the present Enactment and its insertion now, we feel, would only be an act of justice, placing as it would, every nationality on the same footing.

Moreover a similar provision was embodied in the Labour Enactment which was superseded by the present one, and worked then to the satisfaction of all.

It also seems significant to note that in Ceylon, where conditions most nearly approximate our own, the absconding of free coolies is considered an offence and adequately punished.

Now that agriculture in these States promises to become a Staple Industry, reasonable protection by Government of the great interests involved can surely be expected.

We feel certain that the gravity of the situation is not realized outside planting circles and equally sure, that, once realized, Government will not tarry to immediately cause a clause as aforesaid to be inserted in our Labour Enactment.

Representation.

So many large and important questions have arisen affecting the future of the Planting Community which has now become an integral part of the Malay States that the time is rapidly coming, if it has not already come, when your Association should ask Government to allow them a Planting Member on each of the State Councils. To quote instances, where the opinion of Planters might profitably have been obtained before legislation, we only instance the Labour Enactment; the new Land Rules; the raising of the Export duty; Hospitals; treatment of ores, etc.

As for the Labour Enactment for instance, this ordinance was passed without any reference to your Association, and in many ways it has proved of the greatest disadvantage to us. Had similar clauses to those obtained in the Chinese Mining and Agricultural Labourers Ordinance been included in the General Labourers Ordinance, we should have had little to complain of. We trust we shall soon be able to see the necessary amendments carried into effect, but had the Ordinance been previously discussed by your Committee such amendments would have been unnecessary. Considerable delays have arisen, and much annoyance given to many would be investors by the long delay in the granting of land and had Government consulted you before determining their basis of rental it would not have been necessary for a subsequent version of the terms settled in December. As Government has always shewn itself willing to meet us on all points we have brought to their notice, we trust the day is not far off, when we shall have a Member of Council assisting the Government in any legislative action that may be necessary, and likely to affect your interests.

Director of Agriculture.

During the past year the Director of Agriculture has taken up his appointment. He has necessarily been much occupied in organizing his Department and as soon as that is done we are in hopes that he will be in a position to deal with the white ant question which continues on some places to be a source of trouble to Hevea. The Curator of the Selangor Museum has written a treaties on white ants but there remains still much to be done in the study of their natural history, manners and customs. We trust an Entomologist will soon be appointed who will work in conjunction with the Director of Agricultnre and assist in his enquiries into the special diseases, and pests to which the various cultures of the country are liable. We regret that so far Government has not appointed an Analyst or Chemist, an appointment recommended by the deputation which met His Excellency the High Commissioner when first he visited Selangor in 1904. Now that Mr. P. J. BURGESS, formerly Government Analyst to the Straits Settlements, has resigned, the services of a practical Analytical Chemist are all the more needful.

Burgess Mission.

During the past year Mr. BURGESS has visited Europe and his Report has been published in the Agricultural Bulletin for December. We must express our surprise that its essential points were not communicated to your Association before they were given to the world in the columns of a Ceylon Newspaper. The Report is extremely interesting and the drawbacks to cultivated Hevea mentioned therein are only such as time will overcome and in the opinion of your Committee there is practically nothing in it to cause disquietude in the minds of investors. The best methods for treating Latex and drying the rubber etc. are still in process of elaboration, and Mr. BURGESS' Report should very considerably elucidate points that are at present still in the elementary stage. Your Committee feel sure that the rubber planters of the Malay Peninsula will still retain their keenness for arriving at the best economical methods of treating their produce.

Experimental Gardens.

We have not yet received the Government Report upon the Experimental Gardens at Batu Tiga, the delay being doubtless due to the fact that Mr. STANLEY ARDEN, the Superintendent of the Gardens, has resigned his appointment. We understand that experiments have been made in growing Rubber at various elevations, and we trust that Government will continue these valuable experiments. It would appear to you all a retrograde policy should Government now abandon a project which was originally started at the instigation of the Association, solely for the temporary want of a man who can readily be replaced, and we confidently look to the Director of Agriculture to develope these experimental gardens which must in time prove of great value alike to Natives and to Europeans; and a reference to the last U. P. A. Annual Report containing excerpts from Mr. WILLIS' Report is sufficient to shew the value of such gardens.

Exhibitions.

The Director of Agriculture has done good work in initiating local exhibitions, (so far only one however has been held) which would induce a healthy competition amongst Natives.

Your Members have assisted at all the Annual Shows held at Kuala Lumpur, Penang and in Liverpool, and we feel sure that they will equally assist at the Singapore Exhibition to be held in August. A very large representative Exhibition of Rubber from various parts of the world is to be held at Kandy, Ceylon, in September, and we trust that all Members will assist in showing specimens of what the Malay Peninsula produces.

Posts and Telegraphs.

The Establishment of local offices in Districts where there are a sufficient number of Residents both European and Native has already formed the subject of correspondence between your Committee and Government, but so far the necessary facilities have not been conceded. Selangor is fairly well equipped as to telephonic communication, but Perak and Negri Sembilan are still without it. We enumerate a few of the needed Postal Reforms (*a*) quicker despatch of the European and Indian Mails on arrival at Penang where they are frequently detained 18-24 hours quite unnecessarily, (*b*) the landing of Singapore Mails for Kuala Lumpur, etc. at Malacca whereby a saving of 20 hours or more may be effected, (*c*) a better service on the Seremban-Port Dickson line (this service being much slower now than formerly when letters were handed out at stations to the Station Master) as there is no possibility of a direct communication with Port Diction other than the Railway.

Loans to Planters.

These have proved of real advantage to many smaller capitalists and have enabled the borrowers to improve thier properties and to tide over the hard times. We trust that Government will in no case find its confidence misplaced.

Land Rules.

A very serious step was taken by the Government of the F. M. S. by raising, as from the 8th of December, 1905, the quit rent of Agricultural land from $1 to $4 for first quality land and to $3 for second quality land after the first six years.

No doubt an industry as flourishing, as rubber planting is just at present, can reasonably be expected to contribute towards the revenue of the country in which it is produced. Whoever framed the Rules for increased quit rent however, cannot have realized that an increased tax on land generally not only affects one produce, but all, without distinction. Rubber under its present extremely lucrative conditions, no doubt can stand an increase ½*d*. per lb. in its cost of production: but what, if rubber cultivation becomes less remunerative; and, particularly, what of other products? For the cultivation of coconuts for instance, a sound industry, that surely should receive all possible support from Government, it is quite safe to predict that in future no further land will be taken up, unless the present rates of quit rent are again reduced.

To handicap, one and all, agricultural products so heavily, would seem all the more unjustifiable, when quite as big a revenue could easily have been obtained from rubber through an export duty on a sliding scale, similar to the one now in force in respect of tin and coffee.

The whole policy seems all the more grasping, when it is remembered that only three weeks after the publication of these increased quit rents, the export duty was gazetted as raised from 1½% to 2½%.

Measures like these are bound to have an unfortunate effect on capital, which is only too easily frightened away. Granted all the superior advantages that the F. M. S. have so far held in regard to plantation rubber: it is well to remember that other and neighbouring countries are only too eager to attract capital, to exploit the latent resources of their soil. Without multiplying instances, we may point out that in Sumatra land can be had for 1*s*. per acre, free of quit rent, and that a recently floated concern in British North Borneo received from the Chartered Company a pledge to be exempt from export duty of any kind for the next 50 years.

The introduction of these new Land Rules has been felt very severely and all the more so, as all previous applications for land were held up for over six months. Notwithstanding earnest appeals made by your Committee on this point, Government have refused to modify their decision in any way. We are however glad to be able to report, that our representations have at least in one point been successful, *viz.*: in that the maximum quit rent only becomes due after the 6th year, and not after 5 years, as originally gazetted.

Rubber.

The triumphant progress of this part of our Agricultural Industry has continued unslacked. The fame of the F. M. S. as a rubber producing country is spreading far and wide, and capital, both British and Continental (especially Belgian) has freely flown in during the year under review.

The Census of acreage in bearing and planting therefore shows a considerable increase. There are 39,000 acres under cultivation with a reserve of 96,000 as compared with 26,000 and 68,000 in 1904, and much of the reserve will doubtless come into cultivation during the year, Practically the whole of the cultivated area is under Para Rubber, either interplanted or alone. The returns sent us are appended.

Your Committee would be rash to prophecy the future output in lbs. Sufficient to say that the yields from 5-6 year old trees have far surpassed our most sanguine hopes, but what the ultimate yields will be of these trees as they get older, we cannot forsee, for we have no reliable figures to hand over large areas of 7 or 8 years old plantations.

The estimated exports of dry rubber for 1905 were 60½ tons, the actual amount being 103½ tons,* whilst in the coming year 222 tons are estimated.

Mr. PFENNIGWERTH of Lowlands Estate deserves our greatest thanks for discovering the value to be obtained from our Rubber shavings. This unexpected revenue will be welcome to other Rubber producing Countries as well as to ourselves.

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* Export from	Selangor	 1,199	pikuls.
Do.	Perak	 341	,,
Do.	Negri Sembilan	 200	,,
	Total	... 1,740	

These are the official figures; our own returns only shew 85 tons, *i. e.*, 18½ tons short of the total exported.

Rambong (*Ficus elastica*) has proved to be less productive than was expected, and younger trees, though yielding well to start with, have afterwards given disappointing results. Rambong has proved less hardy than Hevea and more subject to the attacks of caterpillars etc. Cases to have occured in which these trees have been seriously affected by the calcining of arsenical ores. This process of treating arsenical tin ores is one that has become a most serious source of danger alike to the health and comfort of the Community, and is a menace to all surrounding vegetation. The effect is said to spread for at least ten miles and we are aware that at least five miles from the main centre of calcining operations the jungle is being destroyed. We are able to inform you however that Government is taking strong measures and forbidding the calcining of arsenical tin ores, unless done in proper furnaces which will concentrate the arsenic so as to prevent the fumes becoming a danger to health, comfort or property.

The question of limiting the export of *Rubber Seed* has been under discussion, but without the co-operation of Ceylon, it is impossible to approach Government on the subject; and from correspondence carried on with the Planters' Association of Ceylon it would seem as if that co-operation could not be looked for by us.

Seed oil.—No large quantity has so far been exported and the additional profit to be derived on this account remains a matter for conjecture.

Coffee.

The prices obtained during the year have assisted greatly towards bringing Rubber into production at a low figure, but it is very doubtful with the bright prospects of Rubber and the increased land charges, whether new land will be taken up for the cultivation of coffee alone, or even whether land at present under coffee will be continued as such. Prices on the whole have been favourable and altogether the success of the year before last, although modest, has continued to attend this branch of the planting industry during the past year.

Coconuts.

This product with the exception of a few Estates may be at present classed as a Native product. The satisfactory increase of some 10,000 acres bringing the cultivated acreage up to approx. 100,000 acres, valued at 17 million dollars would appear to reflect credit on the action taken by the Government in establishing a Department for the guidance to Natives as to protection against beetles.

The Oil Mill at Kuala Selangor, it is satisfactory to note, continues as a source of profit to its owners and may be pronounced a complete success.

Praedial Produce Enactment.

Your Committee have approached Government for protection under this Enactment and have hopes that Latex and Bark from Rubber will be included in the Enactment.

Drink.

So far little progress has been done to check the sale to Natives of injurious liquors which only too often lead them to sickness and debt.

Road Frontages.

The Correspondence, your Committee have had with the Government has been beneficial, as, we believe, it has now become the declared policy of the Government to discontinue the previous practice which has in the past proved so detrimental to planting in numerous districts, notably those of the Coast.

Fixity of Exchange.

The long expected fixity of exchange came with a 2/4 dollar and, although higher than hoped for, will no doubt ultimately be of advantage to the planting interests generally.

General.

Your Committee feel that the time has come when it is necessary to have more money at their disposal to enable them the better to give all information as to the conditions of the Planting Industries of the Malay Peninsula.

During the past year 15 Estates have been added to the list of Members and more are likely to come in; the present number being 111. This will involve considerable extra work for your Secretary, and a new basis of subscription will be necessary to meet both the printing and secretarial charges.

For the Committee,
C. MEIKLE,
Chairman.

APPENDIX.

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U. P. A. CENSUS RETURNS,
1st JANUARY, 1906.

Returns were received from Seventy-seven Estates in Selangor, Twenty-two in Negri Sembilan and Eight in Perak.

GENERAL ACREAGE.

	Rubber.	Coffee.	Rubber and Coffee Interplanted.	Coconuts.	Sundries.	Total Cultivated.	Total Uncultivated.	Gross Total.
Selangor ...	16,181 A.	1,818 A.	7,244 A.	1,455 A.	778 A.	26,955 A.	50,745 A.	77,700 A.
Negri Sembilan	3,843 ,,	709 ,,	3,670 ,,	334 ,,	74 ,,	7,649 ,,	29,777 ,,	37,426 ,,
Perak	1,242 ,,	685 ,,	624 ,,	1,674 ,,	76 ,,	3,946 ,,	15,592 ,,	19,538 ,,
	21,266 A.	3,212 A.	11,538 A.	2,463 A.	928 A.	38,550 A.	96,114 A.	134,664 A.

CROP.

	CROP 1905.			ESTIMATED CROP 1906.		
	Rubber.	Coffee.	Coconuts.	Rubber.	Coffee.	Coconuts.
Selangor ...	160,266 lbs.	103,433 pks.	328,375	422,947 lbs.	34,185 pks.	587,500
Negri Sembilan	39,010 ,,	2,828 ,,	8,000	100,550 ,,	2,330 ,,	8,000
Perak	4,470 ,,	957 ,,	202,374	9,300 ,,	1,425 ,,	315,400
	203,746 ,,	107,218 ,,	538,749	532,797 ,,	37,940 ,,	910,900

RUBBER ACREAGE.

	PARA RUBBER.				GETAH RAMBONG.				PARA AND FICUS INTER-PLANTED.				Total.
	5 years and over.	3 years and over.	1 year and over.	Under one year.	5 years and over.	3 years and over.	1 year and over.	Under one year.	5 years and over.	3 years and over.	1 year and over.	Under one year.	
Selangor ...	3,507	2,873	5,790	6,996	188	70	98	10	220	156	26	85	20,019
Negri Sembilan	1,423	1,076	1 924	1,848	...	—	—	—	—	145	93	15	6,524
Perak	62	106	417	431	—	4	—	—	—	—	—	—	1,020
	4,992	4,055	8,131	9,275	188	74	98	10	220	301	119	100	27,563

LABOUR FORCE.

	Tamils.	Malays.	Javanese.	Benjarese.	Chinese.	Total.
Selangor ...	1,819	138	631	240	212	10,040
Negri Sembilan	1,744	350	170	25	509	2,798
Perak	577	213	158	2	525	1,475
	11,140	701	959	267	1,246	14,313

PERSONAL.

Mr. E. W. MAIN of the Royal Botanic Gardens, Kew, has been appointed Superintendent of the Government Plantations at Batu Tiga in Selangor, in place of Mr. STANLEY ARDEN who has resigned the appointment as previously mentioned.—*Editor.*

THE AGRICULTURAL SHOW.

Readers are reminded that this event is due on August 16, 17, 18. Schedules of Prizes may now be obtained from the Honorary Secretary, Singapore, and all information, entry forms, tickets for railway and steamer transport also. Entries for all Divisions should be in writing and received by the Secretary 7 days before the Show opens, and in the cases of Horses and Dogs, three weeks. Many exhibits of special interest are promised, and it is hoped that planters will send a really good show of rubber this time. A large number of Cups are promised for various exhibits besides silver medals and diplomas.

H. N. R.

GOW, WILSON & STANTON, LIMITED.

13, ROOD LANE, LONDON, E. C.
May 11*th*, 1906.

At to-day's auction, 342 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer. The total weight amounted to about 15 tons, Ceylon contributing 3 and Straits Settlements 12.

Though this was a large offering which included several attractive parcels of fine quality sheet and biscuits, orders were rather scarce, and consequently prices marked some irregularity. Where sales were effected, the price generally realised for fine biscuits and sheet was 6/1½, but several parcels were withdrawn from sale for lack of support. For scrap grades also competition was less animated than at the last auction, though for the finer qualities about last rates were obtained. There was a large consignment of fine sheet and other grades from Bukit Rajah amounting to 2¼ tons, and the finer qualities met with good attention, realizing up to 6/2¼ per lb.

Owing to the increase in the size of the sales lately, it has been decided in the interests of the Trade generally, that the auction shall in future be held at the Commercial Sale Rooms, and this new arrangement was inaugurated to-day.

QUOTATIONS.—Fine sheet, 6/1½ to 6/2¼.
Fine pale washed crape and ribbon, 6/- to 6/2¼.
Do. darker, 5/1¾ to 5/11½.
Do. dark, 5/-.

Fine pale worm, 6/2.
Fine biscuits, 6/1½ to 6/1¾.
Rough biscuits and rejections, 5/3½ to 6/-,
Scrap, fine, 5/2 to 5/3½.
Medium, 4/- to 4/9.
Low scrap, 2/-.
Rambong. 4/3½.

PLANTATION BISCUITS AND SHEET TO-DAY.—6/1½ to 6/2¼, same period last year, 6/6½ to 6/8½.

PLANTATION SCRAP.—4/- to 5/3½, same period last year, 4/6 to 5/-.

FINE HARD PARA (South American).—5/3½, same period last year, 5/7¾.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

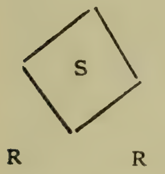
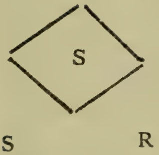
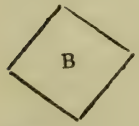
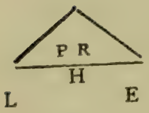
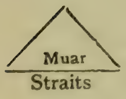
212 packages at 5/9¼ per lb., against 227 packages at 5/11½ per b. at last auction. Particulars and prices as follows :—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Tudugalla	3 cases fine palish to darkish biscuits, bought in. 1 case fine palish scrap bought in. 1 case low scrap, bought in.
Culloden	6 cases darkish pressed crape, 6/1½. 2 cases dark, 5/-. 2 cases dirty scrap, bought in.
◇ K	6 cases pale to dark biscuits, bought in.
◇ D C	3 cases fine darkish biscuits, bought in. 1 case good rough biscuits, bought in. 3 cases good palish cloudy Ceara biscuits, bought in. 1 case rejected Ceara biscuits, bought in.
Rayigam F B	10 cases pale to dark biscuits, bought in. 1 bag darkish scrap, bought in. 1 case scrap and rejections, bought in. 3 cases heated biscuits, bought in. 1 case good scrap, bought in. 1 case scrap and pieces, 4/6.
Clontarf	1 case fine darkish biscuits, bought in.
Tallagalla	1 case fine darkish biscuits, 6/1½. 1 case fine scrap, 5/3½. 2 cases dark low scrap, 2/-.
Warriapolla	4 cases fine very pale to darkish biscuits, 6/1½. 1 case darker, 6/1½. 1 case good scrap, 5/3½.
Gikiyanikande	2 cases fine pale worm, 6/2. 2 cases fine darkish crape, 5/11. 1 case dark, 5/-. 1 case very dark, bought in. 1 case dark rolled, bought in.
Densworth	3 cases fine darkish biscuits, 6/1½. 1 case darker, 6/1½. 1 case fine palish scrap, 5/3½. 1 case darkish scrap, bought in. 2 bags scrap and rejections, bought in.
Doranakande	2 cases dark cloudy biscuits, 6/1½. 1 case rough sheet, 5/10. 2 cases fine palish scrap, 5/3¾. 1 case good dark scrap, 4/9.

Mark.	Quantity Description Price per lb.
Ambatenne	2 cases fine palish biscuits, 6/1¾. 2 cases dark biscuits, 6/1¾. 1 case dark biscuits (mouldy), 6/-. 2 cases pieces, 5/6. 1 case good pale scrap, 5/3½. 1 case darker, 5/3½. 1 bag dark, 5/3½. 1 case dark pressed, 4/-. 3 ceses low scrap, bought in.
Duckwari	1 case fine pale to dark biscuits, 6/1½. 1 bag fine pale scrap, 4/8. 1 package good rejected biscuits, 4/8.
Halgolle	2 cases fine palish to dark biscuits, bought in. 1 case palish mixed scrap, 4/6.

STRAITS SETTLEMENTS.

Mark.	Quantity Description Price per lb.
Jebong	9 cases fine amber sheet, bought in. 1 case scrappy sheet, 5/0¾ 1 case fine scrap, 5/3½.
GM SB	4 cases fine amber sheet, bought in. 1 case fine pale scrap, 5/2½. 1 case pressed scrappy sheet, 4/8½.
	5 cases fine amber sheet, bought in.
	1 case good dark scrap, bought in.
KK	1 case fine pale sheet, 6/1½. 1 case fine Rambong ball, 4/3½. 1 box scrap, etc., 4/9.
Beverlac	4 cases fine dark biscuits, 6/1½ bid. 8 cases fine dark sheet, 6/1½ bid. 1 case sheet, 6/1½ bid. 14 cases fine palish to darkish sheet, 6/1½ bid. 6 cases darkish cloudy biscuits, 6/1½ bid.
PS PR	12 cases fine pale crape 6/2. 1 case fine palish crape, 6/-.
Pataling	1 case darkish crape, bought in. 2 cases dark, bought in.
Highland	7 cases fine palish crape, 5/11½. 8 cases darkish, 5/1¾. 4 cases dark, brownish, 5/3¼.
	1 case good rejections, 4/10½. 9 cases scrappy sheet, etc., 5/1. 4 cases sheet, 5/1½.
LEA	7 cases fine pale crape, 6/2¼. 5 cases fine pale to darkish sheet, bought in.
LEB	1 case fine scrap, 5/0½. 1 case good rough sheet, bought in. 1 case good sheet, bought in. 1 case rough biscuits, bought in. 1 case darkish crape, bought in. 1 case rejected biscuits, etc., 5/1½.
	2 cases pressed scrap, etc., bought in. 1 bag same, bought in. 1 case good scrap, bought in.
	8 cases fine pale ribbon, 6/2. 1 case dark, 5/3. 1 case darker, 5/5.

MARK.	QUANTITY, DESCRIPTION, PRICE PER LB.
W P M	4 cases fine amber sheet, 6/1½, 2 cases darker, 6/1½. 2 cases fine palish scrap, 5/3½.
Tiger Asahan	4 cases fine amber biscuits, 6/1½. 4 cases dark biscuits, 6/1½.
Bukit Lintang	4 cases fine palish biscuits, 6/1½.
B L A	4 cases fine amber washed sheet, bought in.
B L C	4 cases fine pale to darkish crape, bought in. 1 case darkish to dark, bought in.
B L R	1 case Rambong crape, bought in.
DWHS	2 cases fine darkish washed sheet, 6/1½. 1 case fine palish crape, bought in. 3 cases darkish crape, bought in. 1 case good palish to dark washed sheet, 6/1½.
B R R Co Ltd	29 cases very fine large amher sheet, 6/2 to 6/2¼. 6 cases little darker, 6/1½ to 6/1¾. 7 cases paler bubbled, 6/1. 5 cases good darkish scrappy sheet, 5/3½. 9 cases good scrap, 5/1 to 5/3½. 1 case good rejections, 5/3½. 3 cases good cuttings, 5/4½. 4 cases fine sheet rejections, 5/10. 2 cases good scrap, 5/2.

SHIPMENTS OF PLANTATION RUBBER.

FROM COLOMBO AND GALLE.

1906	First three months ...	31 tons.
1905	Do. ...	12¼ „
1904	Do. ...	9 „
1903	Do. ...	5¼ „

FROM SINGAPORE.

1906	First three months ...	47 tons.

FROM PENANG

1906	First three months ...	9 tons.

Total Exports from Ceylon and the Straits Settlements for first three months, 1906, 87 tons.

F. M. S. LABOUR QUESTION.

The following letter by Mr. E. V. CAREY on the labour problem in the Federated Malay States appears in the *India Rubber Journal:*—

It would appear from what one occasionally hears that fears are entertained in certain quarters of a dearth of labour in the Federated Malay States and perhaps the views of one who has been many years out there, and who has visited the labour districts of Southern India and Java, in person, may be of some interest. As you no doubt know, the rubber planter in the Federated Malay States gets all his felling done by Malays or Sakeis (the aborigines), and his draining by Javanese, a very large number of whom are permanent settlers and landowners. Of such labour there is suggested scarcity. For the general work of an estate we prefer, if we can get him, the Tamil or native of the Madras Presidency, and we hope that the undoubted popularity of the country and the work will attract these men over in sufficient numbers for all our requirements. But it must be admitted that competition for the services of the Tamil is very keen, and he would be a bold man who would guarantee an abundance of this class of labour in the future. Recognizing this fact, the Government of the Federated Malay States and Straits

Settlements did me the honour in 1904 of despatching me on a commission of inquiry to the neighbouring Dutch Dependency, Java. The result of my investigations there was the discovery that close at hand we had an amazingly densely populated country, with over 32,000,000 inhabitants, and an annual increase in their number of 600,000. I found the Dutch authorities most disposed to eye with favour the idea of their people coming to the Federated Malay States, and recruiting agents there gave me letters, which I still hold, guaranteeing to supply me with practically as many coolies as I could possibly want. Now there are several thousands of these Javanese who have been imported, more especially on sugar estates, doing well, and giving every possible satisfaction to their employers. The drawback of this labour to the "free" labour planter, as all, or almost all, rubber planters are, is that the Dutch Government insists upon indentures, believing that what the Liberal party designates "slavery," is the best method of securing protection for their people when in a foreign country. Now, we like all our coolies to be free to go and come as they choose, subject to the discharge of their financial obligations, and to a month's notice of their intention to leave us and go elsewhere. It is apparent, therefore, that the objection to the importation of Javanese is purely technical, and does not in any way affect the contention that in this quarter lies our insurance against a labour famine. I may add that there are in the Federated Malay States large numbers of agricultural Chinese who are employed on many estates for road construction, earth shifting, etc. It is my opinion that the failure of the average planter to appreciate the Chinaman as an estate coolie is due largely to the fact that we cannot speak his language, and therefore cannot get the best results out of him. When serving under indentures as a mining coolie, paid in proportion to the amount of tin or gold, or whatever it may be, that he brings in, this objection at once disappears, and the Chinaman is indeed hard to beat.

With all these considerations before me, I state deliberately that I know of no country dependent for its supply in any degree upon imported labour so favourably situated as the Malay Peninsula, and I cannot foresee the possibility of a scarcity of agricultural labour, even in the very remote future, with Java willing to help us and boasting a population far in excess of her needs. Given too, that Sumatra is rapidly opened up entirely by Javanese, there would still be lots of labour to spare for us.

There are two further considerations which must not be overlooked. The first of these is the existence of a very strong etiquette amongst the planters regarding the employment of each other's coolies, and this causes them to go to the trouble of themselves importing all their requirements. The other factor is the cordial and liberal assistance and sympathy of a rich Government. It would take too long to state here all that the Government have done, are doing. and will do, to help in the development of the country, but especially in connection with the labour question, the liberality and sympathy of the official attitude has been beyond all praise.

THE CEYLON AGRICULTURAL SOCIETY.

TO-DAY'S MEETING.

MR. BAMBER'S PAPER ON CAMPHOR.

A meeting of the Agricultural Board was held in the Council Chamber at noon to-day, H. E. the Governor presiding. The principal item on the agenda was a paper by Mr. KELWAY BAMBER. There were present:—

The Hon. H. WACE, C.M.G. (Acting Colonial Secretary), the Hon. Mr. H. L. CRAWFORD, the Hon. Mr. P. Arunachalam, the Hon. Mr. S. C. OBEYESEKERE, the Hon. Mr A. KANAGASABAI, the Hon. Mr. FRANCIS BEVEN, Mr. M. KELWAY BAMBER, Dr. J. C. WILLIS, Dr. H. M. FERNANDO, M.D., Mr. L. W. BOOTH (Chief Collector of Customs). Mr. G. W. STURGESS (Government Veterinary Surgeon), Mr. E. E. GREEN (Government Entomologist), and Messrs. R. MORISON, HERBERT WRIGHT, R. B. STRICKLAND, D. Joseph, C. DRIEBERG. W. DUNUVILLE, E. B. DENHAM (Secretary), and Mr. L. S. RAGHANA AIYAR (visitor).

A letter from Mr. SIMON FERNANDO MUDALIYAR offering land for experimental garden was read.

The Governor's Remarks.

H. E. the Governor said: Gentlemen, we will taken the Progress Report as read. It is eminently satisfactory. You have just heard this letter from Mr. FERNANDO making a most generous offer. It shows how the ideas of the Society have permeated the people in various parts of the Island. I find by this report that Mr. S. P. MAHAWALATENNA has kindly promised to allow his garden at Balangoda to be open to the public as an experimental garden, and I find at Weligama the Mudaliyar has also offered facilities for experimental gardening. I think these gentlemen deserve the thanks of the Society for the interest they have shown in the work of the Society. I observe that the Delft branch of the Society has decided to plant cotton in Delft on a larger scale, and also that Messrs. NIELAND and WILSON undertake to purchase any cotton sent to them; and favourable reports regarding the progress of cotton on the North-West province at Balangoda and in the Udakindapalata of Uva have been received by the Society. I need hardly say how important this industry may become. We have sent a surveying expedition to the Wanni to see whether it is possible to get water. I see by records that throughout the Wanni cotton has been grown in times gone by, and it may be one of our staple exports in the future; and I am sure you welcome as I do any efforts made in that direction. This report shows the energy with which the work has been carried on in all parts of the country. I am very glad to see that at Nuwara Eliya specimens of diseases in plants have been exhibited. I think these are most useful exhibits, and I have no doubt that the people who had their attention drawn to them would benefit greatly by noting the appearance of the diseases and the possible results shown by the Botanic Department.

His Excellency then went on to announce the business of the day, and called upon Mr. KELWAY BAMBER to read his paper.

Mr. Kelway Bamber's Paper.

Mr. KELWAY BAMBER said: A considerable amount of attention has been given to this subject lately owing to the high price of camphor now ruling, and, before discussing the method of growth and cultivation, it will be as well to briefly outline what has already been done in Ceylon, with a view to its introduction as a new minor product. During the year 1895, Mr. NOCK, late Superintendent of the Hakgala Gardens, brought the matter to the notice of planters in various parts of the Island at elevations ranging from 2,500 to 6,450 feet, and under all conditions of climate and rainfall, and distributed about 1,000 plants raised from Japanese seed. These were planted out chiefly along roadsides between tea bushes, and apparently in most cases received little or no special attention. About 1900, reports from the various estates were obtained, which proved that under suitable conditions of soil and climate camphor would thrive at most elevations from about sea level to over 6,000 feet. It was found that a deep, well-drained sandy loam in sheltered situations answered best, the growth in such cases being fairly rapid, the trees reaching 18′ to 20′ or more in five years, with a spread of 8′ to 12′ or more and a stem 6″ to 7″ in diameter, this comparing favourably with the growth in their native habit at in hillsides and in valleys in China, Japan and Formosa, Mr. Nock, in a paper on the subject in 1900, points out that the best 5-year-old tree was growing at Veyangoda at 100″ elevation, and where the rainfall was 100″, falling on about 180 days, the height of the tree was 25′ with corresponding girth; the next, best was a tree at Hakgalla 20′ high, with a spread of 13′ and a stem girth of 24″. In 1898 experimental distillation of camphor from the leaves, shoots, and wood were made by Mr. S. A. OWEN, of Lindula, and Mr. NOCK at Hakgala, with somewhat variable results, in some cases no camphor being obtainable, although the atmosphere around the stills was full of the pungent smell, while in another case Mr. OWEN obtained camphor at the rate of 15 lbs. per ton of prunings, or 0·67 per cent.

In May, 1900, Dr. WILLIS arranged for a series of distillation, to be conducted by myself in Colombo, and prunings of camphor from Hakgala and other districts were experimented with under varying conditions, the results of which were published in a circular issued by the Royal Botanic Gardens in November, 1901.

On an average about one per cent. camphor and some oil was obtained, but the results were not always satisfactory owing to some cause not clearly understood at the time. During the last 12 months further experimental distillations have been made, with the results, in one instance, that about 2 per cent. of camphor, with a small quantity of oil, was obtained, while on the average the yield amounted to 1·5 per cent. on the fresh prunings, and it is upon this basis estimate may now fairly be made. The yield is somewhat lower than that from twigs of old trees in Japan, which give 2·21 per cent. and much lower than the average from the whole tree, *viz.*, 4·22 per cent.

From these experiments the cause of the comparatively low yields previously obtained was discovered, and in practice it should now be possible to secure the camphor without loss. Another detailed circular will shortly be issued on the subject by the R. B. Gardens, but meanwhile I propose to briefly describe the method of planting and the precaution necessary in the distillation, if successful results are to be obtained.

The Seed from Japan.

Up to the present camphor has been raised almost entirely from seed from Japan, plants from cuttings not being readily raised in Ceylon.

The seed is round, black, and the size of a vetch or sweet pea, about 7,000 going to a pound. The germination is frequently very irregular, but seed obtained in November should have a germination of 50 to 60 per cent.; though in some cases hardly a plant has been obtained from several pounds.

The seeds should be sown as soon as possible after receipt, first soaking them in water for 24 or 48 hours, and separating the heavier ones from those that float. The beds should be carefully prepared and protected from insects and vermin, as the seeds are very liable to be eaten. The soil should be a free sandy loam, with a good proportion of leaf mould, and well drained. The seed may also be germinated in pure sand or waste fibre, or Jadoo fibre, and any care given at this stage would be well repaid.

It should be sown about three quarters of an inch deep, and the beds well shaded to preserve an even degree of moisture, which is essential for germination.

The seedlings should, when 3″ to 4″ high, be picked out into well-prepared soil in supply baskets, and kept shaded and watered until they begin to grow, when the shade can be gradually removed to accustom them to the full sun.

When 9″ to 15″ high they are at their best for planting out, but may remain in the nursery until 2′ or more if the weather is not suitable It is needless to point out the necessity of waiting for suitable planting-weather rather than run the risk of losing them altogether, but, if dry weather should occur after planting out, thickly mulching the soil round the plant with any available organic matter will do almost as well as watering to keep them going until the rains fall. Mr. NOCK has tried making cuttings from suitable branches, but not very successfully, as if too dry they soon shrivel up, and too wet and cold they decay before the roots are formed. These attempts were made at Hakgala, and possibly better success would be obtained at lower elevations and in a warmer climate.

Here again waste coconut fibre or Jadoo might be tried, as it would be a great advantage to obtain plants by this means.
The best material for cuttings is that from straight, healthy, and well-matured shoots of the current year's growth, about ¼″ to ¾″ in thickness and 6″ to 9″ long. The cuts should be clean and just below a joint to form the base of the cutting, this being a point of great importance.

The beds for cuttings should be similar to those for seeds, and may have a layer of charcoal and sharp sand an inch thick on the surface.

To insert the cuttings an opening is made with a spade, the cutting put in, and the spade withdrawn, allowing the earth to fall back into its place and then pressing it firmly down. They should be planted as soon after removal from the tree as possible, and the beds well shaded, gradually allowing them sunlight as they became rooted, which takes place from 2 to 3 months.

Camphor may also be propagated by layers. where the branches are low enough for the purpose; and this wlll probably be found one of the best means of obtaining good plants and possibly of selection for yield. The branches should be bent down, laid in a trench in the soil after being cut or twisted to break some of the fibres and encourage root development, then covered with soil, small pegs being inserted to keep them in position.

A Susceptible Tree.

In planting out care should be taken to see the holes are large and deep, and the soil well loosened at the bottom, and surface soil should be used for filling them up. From the present growth on various estates it is evident that the tree is very susceptible to its surroundings, as it is rare to see 3 or 4 trees planted together of uniform appearance. This may, of course, be due to differences in the vigour of the seedlings, but is more probably owing to physical variations of the soil in which it is planted. The difference in growth and vigour is sometimes so great that a small area of the prunings obtained from the same aged trees have varied from over 100 lbs. to about 8 lbs. per tree, the latter amount being quite unprofitable. The importance of a careful selection of soil and situation is, therefore, most apparent. As regards the latter, the trees will not stand exposure to rough winds, so that more or less protection during the S. W. monsoon is essential for luxuriant growth. Probably 8′ by 8′ would be the best distance for planting, and the trees are to be kept in the form of bushes, and this distance would give about 680 bushes per acre.

They can be planted amongst tea with little risk of harming the latter in the factory, as an experiment has shown that a high proportion of camphor leaf, mixed with the tea leaf, was not detected in the finished article, the quantity added being far more than could possibly occur accidentally.

In poor tea-soil the growth is very slow, and much better results will be obtained by planting in virgin soil; the amount of such soil available is, however, limited, which from one point of view may be considered a decided advantage, as the supply of camphor can easily be overdone, unless new uses for it are discovered.

As stated before, camphor has been tried at all elevations, and on all kinds of soil with very variable results. Although the finest tree was grown at Veyangoda, it was generally at high elevations (above 4,000 feet) that the best results were obtained. At Peradeniya, 1,600 feet, the growth was only medium, and the trees never had a very healthy or vigorous appearance, while the percentage of camphor was also somewhat lower. These trees have recently been cut down, and are to be manured experimentally to determine the effect on the growth and camphor contents.

Some patna soils, notably those in Nuwara Eliya, have suited the tree admirably, but on others, poorer in organic matter, the growth is wretched even after five years and could only result in loss if planted on a large scale.

Under suitable conditions of soil, climate and exposure the growth should be sufficiently good to yield one or two prunings in the third year, the best method being to clip the bushes all over evenly with ordinary shears, taking shoots of 6 in. to 10 in. in length. These should be collected without loss of leaf, tied in bundles and taken directly to the still.

Distillation.

The still required for the purpose is of the simplest description, and very similar to that used by the Japanese in Formosa, with slight improvements in the condensers, as perfect condensation is absolutely essential for success. The slightest smell of escaping camphor may mean a loss of 20 per cent. or more, as has been proved by several experiments, and the two means of preventing it and obtaining the maximum proportion of camphor to oil are absolute condensation and *slow* distillation with a minimum of heat.

The still may consist of an ordinary wooden cask, but is better if somewhat conical in shape, and should be about 6′ high, 3′ diameter at the bottom and 2′-6″ at the top; and have a close fitting door at the lower end for the removal of the refuse prunings. The top or a portion of it must be removable, but capable of being hermetically closed. From near the top a large diameter bamboo 5′ to 7′ long passes to the condensing boxes of wood placed in a suitable tank and connected with short lengths of similar bamboo. The still has a perforated bottom and stands over an iron basin built into a small stone or brick furnace. The basin about 2′ 6′ to 3′ in diameter is filled with a supply tube for adding water as required and an overflow pipe closed with a plug during distillations. The condensing boxes consist of bottomless boxes of suitable size, having 3 or more partitions in each with communications at opposite ends of each division to insure thorough circulation of the camphor and water vapours. The tops of the boxes are hermetically closed about one inch below the upper edges, and the boxes are stood in the tank as mentioned above, being connected by short bamboo lengths. Cold water from a stream flows from a pipe or bamboo on the top of each box and then over-flows into the tank, which has an outlet pipe 2″ to 3″ from the bottom. By this means a water seal 3″ deep is kept round the bottom of the boxes. The mixture of camphor, vapour and steam from the still enter the first box just above the water level, circulates round the various partitions, and so passes from box to box, the camphor being condensed in pure white crystals on the walls and partitions as it cools down. The last box is filled with an outlet of bamboo, which can be kept closely plugged with straw. This acts as a safety valve, and enables one to ascertain whether condensation is perfect, as there should be little or no smell of camphore observable. In working the still is loosely filled with the fresh prunings as brought in, the top put on and well luted with clay, water poured into the basin, and a fire lit to bring it rapidly to the boil. As soon as this occurs and a slight smell of camphor or eucalyptus can be smelt at the escape tube on the last box, the fire is reduced and the water merely kept *hot* for several hours. A good plan is to have a glass let into the cover of the first, (or all) of the condensing boxes and as soon as vapour begins to condense on it, to immediately reduce the fire to a minimum, as the object to be gained is to drive of *all* the camphor with as little steam as possible. A small wooden spigot in the top of the still makes it possible to ascertain when all smell of camphor has disappeared, but care must be taken when opening it not to become scalded. When completed probably in 3 to 4 hours the door at the bottom of the still is opened, the prunings removed and the still recharged from the top. All water in the pan, which contains much tannin, etc. in solution is changed by opening the overflow plug and pouring in a fresh quantity through the supply tube. During distillation it is necessary to occasionally add some water to the pan to maintain a constant level and prevent burning. To save time it would be best to have two stills connected with the condensers, as with many citronella grass stills, since the one could be filled, while the other distillation was proceeding; the latter could then be allowed to cool down before opening, without a loss of time. To preserve the heat in the top of the still and ensure the camphor passing away readily, the still should be thickly coated with clay or other non-conducting material, the Japanese method being to surround the still with cane work and ram clay into the space between.

When a condeser is seen to contain sufficient comphor, it should be opened, and the camphor carefully scraped out, every precaution being taken to keep it free from dirt or fragments of any description, otherwise re-distillation would be necessary if the best price is to be obtained. A wooden scraper should be used, contact with metal being avoided as far as posssible while in the moist condition.

The camphor should be placed in a well made box like a tea chest, having a perforated false bottom 4″ or 5″ from the actual bottom, and the top perfectly closed. In a few days most of the oil will have drained into the lower portion of the box, which should be zinc-lined and the dry camphor can be removed, carefully packed in zinc-lined cases for despatch.

By reducing the camphor oil to a low temperature fully 50 to 60 per cent. of solid camphor separates out, and can be removed with a cloth strainer and well drained, the temperature being kept as low as possible while the excess of oil is draining away.

Should any of the camphor be accidentally discoloured, it should be thrown back into the still with a subsequent charge of prunings for re-distillation.

The question of purification by sublimation, re-distillation of the oil for the production of safrol, white oil, and other products will be fully gone into in the circular previously referred to, and need not to be discussed here. The chief uses of camphor are for the manufacture of celluloid, smokeless explosives, fireworks, etc., and medicinally in the treatment of influenza, dysentery and cholera. For the latter disease, it was used most successfully in Naples in 1854, all the cases treated recovering, and it was employed with equal success in Liverpool in 1866. Any outbreak of influenza increases consumption at once, but the chief demand is for the manufacture of smokeless powders and celluloids; it is also said to be employed in one of the numerous rubber substitutes now manufactured.

The price of Camphor; and the world's Consumption.

In 1895 the price of camphor was £8 to £9 per case of one cwt., but during the Chino-Japanese war it reached £20 per cwt., the price at which it apparently stands to-day. This high price may be due to a temporary shortage or to a corner in camphor, and it would be risky to base any estimates on the present inflated prices.

The total world's consumption probably does not exceed 6,000,000 to 1,000,000 lbs., which amount can be produced by Japan and Formosa, though possibly it is becoming more and more difficult in the former country from partial destruction of the trees, and in the latter owing to the dangers of collection.

Taking a medium estimate of what can be obtained in Ceylon, the planting up of 15,000 to 20,000 acres would supply the above amount, so that the price would rapidly fall and the cultivation grow more or less unremunerative, although the trees would always be a valuable asset in the case of a sudden demand, and would yearly increase in value.

It was also stated in 1903 that a limited Company had been formed in New York for the production of camphor by synthesis with a share capital of $1,000,000 and with plant for an annual output of 2,000,000 lbs., the annual amount required by the United States. The crude material employed in the manufacture is turpentine oil, and the yield is said to be 98 lbs. of camphor from one barrel (? 36 gallons) of the oil. At the figures quoted, the cost of production might be anything from 10*d*. to 1*s*. 4*d*. per lb., while the cost of production in Ceylon would be considerably below this. The leading camphor consuming countries are:—

Germany	...	2,000,000 to 3,000,000 lb.
United States	...	2,000,000 lb.
England	...	1,000,000 to 1,500,000 lb.
France	...	1,200,000 lb.
India	...	1,000,000 lb.

In estimating the probable yield per acre, it would, I think, be better to calculate on only two prunings a year, *i. e* , after the two best growing periods, *viz.*, March to May and October to November. During the 3rd year well-grown bushes should then give about 50 to 60 lb. of prunings each, which would give a handsome profit even if present prices were considerably reduced. While it is probable that camphor will be a valuable adjunct as a minor product in many upcountry and other places where Para Rubber cannot be grown, it is as well to bear in mind that the demand is somewhat limited, and that India and other countries have also turned their attention to this product during recent years. I have not gone into detailed estimates of the probable cost of production, but shall be pleased to reply to any questions on this and other points that may be discussed.

Some very important discussion followed the reading of the paper.

Among the speakers was Dr. WILLIS who spoke for some time on the difficulty of getting sufficient seed to enable the industry to become anything but a minor one.

Several speakers joined in the discussion, and eventually His Excellency speaking to the press, asked them to treat the discussion as a private one. We feel compelled to state, however, that His Excellency thought Dr. WILLIS' remarks regarding the inability to obtaining seed in sufficient quantities owing to a monopoly which might shut out the supply entirely, had placed quite a different complexion upon the prospects of the industry than they had worked before when he had only Mr. KELWAY BAMBER'S figures before him.

Improving Village Cattle.

The Acting Colonial Secretary moved :—"That the Society vote a sum of R50 towards the cost of a stud bull for the Nuwara Eliya district." In the course of his remarks he said the vote was made on the application of the local branch of the Society, which, last year, at a meeting it held, brought forward the necessity of improving the breed of cattle, especially the village cattle, of that part of the country.

In answer to His Excellency, Mr. WACE said he did not know the price of the bull. It would probably be an ordinary Scinde bull, which he thought would be very useful to the villagers.

The Hon. Mr. CRAWFORD seconded, and the motion was carried.

Mr. BOOTH asked, if the application was granted, would the Society be prepared to grant similar applications from other parts of the country.

His Excellency:—We should judge them on at their merits. This application is granted now. If any application is made by any particular branch I have a similar grant from the Society, if it can be shown that the Society's funds will admit it, so much the better. We want to improve the breed of the cattle.

Mr. OBEYESEKERE wanted to know if ₨50 would be sufficient.

His Excellency:—The ₨50 is only towards part of the cost. The local Society is to pay the other portion. It is a case of self-help.

Mr. Fernando's Munificence.

His Excelleny said, with regard to the proposal of Mr. FERNANDO "it will be necessary before this case come before us for our adoption to have some report upon it and I suggest that the Government Agent of the Western Province, Mr. OBEYESEKERE and Mr DRIEBURG be appointed a Committee to see Mr. FERNANDO and report upon this at the next meeting. The motion can then be put that the Society thankfully accepts the offer and the thanks of the Society to Mr. FERNANDO can be formally placed on record I therefore propose the Committee as mentioned."

The appointment of the Committee was adopted.

Cotton Experiments.

His Excellency again referred to cotton experiments which he thought had been carried out most successfully. From the Experimental Station 116 pounds of seed had been distributed. Altogether sufficient amount of seed had been acquired to sow up 800 acres. This was very satisfactory as it showed that the cultivation of cotton was being seriously considered. "If this goes on," continued His Excellency, "I hope and believe we shall find that cotton is a very important factor among our industries."

The Board then adjourned.

CEYLON'S PLACE IN THE RUBBER INDUSTRY.

INTERVIEW WITH MR. HOFFMAN.

MESSRS. LEWIS AND PEAT'S LETTER CRITICISED.

Mr. RICHARD HOFFMAN, the well-known London financier, who has been "doing" Ceylon with Rubber in view, besides being directly interested in the industry in partnership with well-known Ceylon planters, leaves by the O.-R. s. s. *Orontes* to-night. During his two months' stay in the island, Mr. HOFFMAN has been nearly everywhere and seen nearly everything there is to see in connection with rubber, having added considerably to his knowledge gained on previous visits to Ceylon and through his connection with the London market; and his opinions may, therefore, be considered as those of an expert.

Ceylon Good Enough.

One of our representatives was able to have a farewell interview with Mr. HOFFMAN to-day; and in answer to a query as to what he thought of Ceylon as a rubber-producing country, Mr. HOFFMAN intimated "worlds." Coming straight out from all the excitement of rubber-company-promoting at home one would naturally expect Mr. HOFFMAN to continue his tour of investigation to the Straits. Instead, however, Mr. HOFFMAN does not intend to go further eastward. "Ceylon is good enough for me," he says.

Asked what he considered the best rubber district, Mr. HOFFMAN said, "I have been to see all the rubber districts I could see. It is almost impossible to make comparisons as to which is the best. It seems to me really that rubber is doing good everywhere except above a certain height. Above 1,500 feet the growth seems to be backward.

I saw the best rubber, however, in Kalutara, Matale and Kurunegala. I was very much impressed by the splendid rubber on Arapolakande, one of the Eastern Produce's estates at Kalutara, which has perhaps the oldest rubber I have seen, with the exception of Heneratgoda. On the former estate I saw a 95-inch tree. One of the finest young estates I have seen in the island is St. George's, which I am sorry to hear is being kept for Ceylon flotation, instead of Londoners being given a chance.

Advice to Planters: Plant Hevea.

Asked if he had any advice to give planters, Mr. HOFFMAN said: "I should think that if anyone who has the chance of planting that magnificent tree Hevea thinks of anything else he deserves to lose his money." To the question of "Have you any advice to give to planters about putting rubber on the market?" Mr. HOFFMAN said "My answer is 6/3*d.* per lb. or 9*d.* above fine Para!"

Messrs. Lewis and Peat's Letter Answered.

Naturally this statement led to discussion of Messrs. LEWIS AND PEAT'S Letter, which was published in the *Times of Ceylon* on Monday last. With regard to this Mr. HOFFMAN said; "I think their letter was a great mistake—against LEWIS and PEAT'S own interests and liable to undo the great benefit to themselves derived from the recent visit of their junior partner, Mr. DEVITT. Messrs. LEWIS and PEAT in London are continually crying stinking fish about Ceylon rubber, continually trying to impress people that they are not going to get as good a price in comparison with fine Para as at present. Nine-pence a pound over fine Para, however, speaks for itself, and Ceylon planters have several years before them before the output will be at all large, and they will certainly themselves find out what method of curing suits them best, and which commands the best price. When plantation rubber comes forward in larger quantities manufacturers will instal their machinery accordingly. Now their expensive machinery is arranged for handling wild rubber; but this will be changed in time; and planters, in the same way that they find out which grades of tea pay them best, will ship the class of rubber which pays them best also. LEWIS and PEAT certainly will not get trade by running plantation Para down. Nine-pence a pound over fine Para, I think, answers their letter. Besides, I could quote you cases where big manufacturers of the finest special articles would use biscuits and none other if they could get enough. At present they do not like to so greatly improve their goods at certain times, by the use of nothing but the purest plantation rubber, because they fear that the return of their goods to the usual sort of thing would be "spotted," and would afford much greater dissatisfaction than keeping closely to the original output, until the real thing can be produced in sustained qualities."

Rubber at High Elevation.

Resuming the conversation about which were the best districts for rubber, Mr. HOFFMAN said, "I have come to the conclusion that what rubber wants is heat, and that, if you can get adequate heat at a high elevation, I see no reason why rubber should not do well there.

"The temperature at which rubber seems to thrive best is an average yearly temperature of 80 per cent. Below that it will grow slower. At a higher temperature it might possibly do well provided a good average rainfall takes place, as evaporation must be excessive. But there is plenty of land at a low elevation. What do you want to go to a high elevation for?"

Don't Buy Worn-Out Tea Lands.

To intending purchasers Mr. HOFFMAN advised: "Don't buy worn-out tea lands. Don't gamble in shares. Buy virgin land and plant it and wait your turn patiently."

He, himself, he said, had been offered acres of worn-out tea land, which he had refused to purchase. All his interests were jungle land. Speaking of the

Prospects of the Rubber Industry,

Mr. HOFFMAN said: "I am afraid that with all the planting that is going on in this part of the world the most important thing to be considered is labour, and if labour is going to cost 50 per cent. more in other countries than Ceylon this will take off value of quite £40 to £50 an acre for estates in bearing. The experiments now going on at Heneratgoda, so very ably conducted by Mr. WRIGHT, will teach the planter eventually how to get the best value out of his trees. Yields for the old trees there are so astounding that figures would only be misleading. Mr. WRIGHT'S "latest" is collecting troughs carried from tree to tree, which, if not practical, is, at any rate, amusing."

Rubber Factories.

"I don't think there will ever be rubber factories here. I don't see why they should be installed here. I do not see the necessity of it any more than I can see the necessity of making chocolate here or sweets in Mauritius.

The Future of the Rubber Market

is beyond human gauge. It is not fair to take the present price of 6*s*. 3*d*. as a normal one. The correct price of rubber is the average for the past three years, say, about 4*s*. 6*d*. or 4*s*. 9*d*. During the next six or eight years, however, until plantation rubber comes forwards in very big quantities, I would prefer backing a 1*s*. rise than a 1*s*. fall in rubber."

Seed Exportation.

"I would not allow a single seed to leave the island," said Mr. HOFFMAN in favour of the export duty on rubber seed. "But after all," he continued, "it is only staving off the evil day when the seed will be planted throughout the East?"

The Government Land Policy.

Mr. HOFFMAN would not criticise our Government's land policy, as he thought that Ceylon men had better opportunities than outsiders of getting land. The difficulties and delays are infinitely more easy to surmount by the local man than by the London financier.

Questioned as to how Ceylon could preserve its good name at home, Mr. HOFFMAN said "The only thing that can be done is to educate the public to discriminate for themselves."

Times of Ceylon.
April 12th.

RUBBER IN COORG.

The planting of Ceara rubber will be largely extended during the coming season, as the success of this species is assured. There should be no difficulty about the germination of the seed, as numerous plants grow up from seed shed by old trees. The filing of the seed accelerates germination. In one case seed scattered in an uncleared forest is coming up successfully. A ryot near here has found himself in possession of three seed-bearing Ceara trees, which were planted by a former occupant of the land. He is showing commendable enterprise in collecting the seed with a view of planting it out this season. It was in 1887, I think, that large numbers of Ceara plants were put out on the Sampaji Ghauts. If the lantana has not entirely choked these out their exploitation now might pay.

Rubber Land.

In the Prospectus of the Perak Rubber Plantations, Ltd., it is stated that "all the rubber trees are planted on virgin soil, which is infinitely preferable to planting on old coffee land, the soil of which is partly exhausted, as is the case with many plantations in Malaya." Statements like these would tend to depreciate properties of the latter description without sufficient reason; for coffee, as a crop, is not exhaustive of the soil (JOHN HUGHES).

Rubber in Madras.

In a letter to the *Madras Mail*, dated the 8th September, 1905, Mr. J. CAMERON wrote :—"The Western Ghauts contain a mile of mineral wealth which may be indented upon by the cultivator for thousands of years." This must be true of other old coffee lands also; and, however unsuited they may be for replanting with coffee, there is no good reason why rubber and other products should not do well on them. That they do well has been amply demonstrated in Ceylon.—*Cor.*, *M. Mail.*

Vallambrosa.

The output of rubber from the Vallambrosa Rubber Co's estate for the year ending 31st March was 39,113 lbs., against the Manager's estimate of 25,000 lbs.

Experiments in Krian.

Times of Malaya,
May 10*th*, 1906.

Mr. CARRUTHERS, Director of Agriculture, has gone to Krian, where he has started some experiments to eradicate weeds in waterways and drains by spraying. Another reason for the journey, says our Kuala Lumpur contemporary, is to enable the Director to continue his investigations into the life history of a moth the caterpillar of which has destroyed the padi crop in Krian; in some cases only 25 per cent. of last year's crop remained. The moth in question belongs to the tribe of Noctuidæ. It is small, greyish white, and flies by night. Measures are being taken to combat the pest.

REGISTER OF RAINFALL AT NEGRI SEMBILAN HOSPITALS FOR MAY, 1906.

Date.	Seremban.		K. Pilah.		Tampin.		Jelebu.		Port Dickson.		Mantin.	
	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.
1	1	19	...	05	...	05	...	24	...	40	...	05
2	...	60	3	80	...	20	...	01	...	...	...	94
3	...	20	...	10	...	35	...	09	2	42	...	54
4	...	...	...	03	...	...	2	40	...	...	...	...
5	1	00	1	15		...	...	...	...	...	...	11
6	...	40	...	07	1	10	...	05	...	70	...	23
7	...	...	...	...	...	...	...	...	...	...	...	...
8	...	98	...	...	...	...	...	...	...	07	...	39
9	4	36	...	03	...	90	...	05	3	60	1	18
10	...	08	...	03	...	...	1	33	...	70	...	56
11	...	72	...	10	...	20	...	...	1	13	...	17
12	...	...	...	...	...	05	...	04	...	...	...	...
13	...	...	...	...	...	...	...	06	...	17	...	...
14	...	12	...	..	...	...	1	45	..	...	...	...
15	...	...	...	...	...	...	...	...	...	...	...	...
16	...	...	...	17	...	45	...	...	...	05	1	14
17	...	10	...	...	...	05	.	10	...	...	...	...
18	...	05	...	...	...	16	...	...	...	31	...	11
19	...	...	...	...	...	...	...	13	...	...	...	...
20	1	72	...	...	...	05	...	...	...	16	...	...
21	...	...	...	32	...	40	...	98	...	...	...	80
22	...	...	...	22	...	...	...	...	..	...	...	...
23	...	36	...	39	...	05	...	...	...	28	...	11
24	..	...	...	...	...	03	...	13	...	04	...	27
25	...	14	...	21	...	...	...	47	...	...	...	45
26	...	44	...	08	...	24	...	27	...	61	1	78
27	...	25	...	07	1	02	...	52	2	21	...	35
28	...	...	...	...	...	...	...	04	...	...	...	..
29	...	54	...	...	...	18	...	15	...	38	...	27
30	...	...	...	...	...	...	...	03	...	96	...	...
31	...	12	...	34	...	43	...	...	...	...	...	...
Total	13	37	7	16	5	91	8	54	13	83	9	45

STATE SURGEON'S OFFICE,
SEREMBAN 12*th June*, 1906.

R. VAN GEYZEL,
Apothecary.

Singapore.

Abstract of Meteorological Readings for the month of May, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	Ins.	°F	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory … …	29·836	140·6	82·3	89·6	76·5	13·1	79·5	·932	77·6	79	S.W.	5·71	1·83

A. B. LEICESTER,
Meteorological Observer.

D. K. McDOWELL,
Principal Civil Medical Officer, S. S.

Kandang Kerbau Hospital Observatory,
SINGAPORE, 18*th June*, 1906.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of May, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29·909	148·1	81·8	89·9	75·9	14·0	78·8	·923	76·76	80·0	S.	13·08	3·37

PRISON OBSERVATORY,
PENANG, *8th June*, 1906.

M. E. SCRIVEN,
Assistant Surgeon.

S. LUCY,
Colonial Surgeon, Penang.

Malacca.

Abstract of Meteorological Readings for the month of May, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	%	%		Ins.	Ins.
Durian Daun Hospital ...	29·833	151·1	79·5	88·8	70·1	18·7	81·3	1·051	63·1	94	S.W.	9·30	3·63

COLONIAL SURGEON'S OFFICE,

MALACCA, 28th *June*, 1906.

F. B. CROUCHER,

Colonial Surgeon, Malacca.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of May, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping ...	...	157	84·16	96	73	23	79·12	928	...	79	...	11·96	2·35
Kuala Kangsar ...	...	...	82·24	93	71	22	77·79	893	...	81	...	4·31	1·60
Batu Gajah ...	...	156	82·47	93	73	20	78·64	933	...	84	...	6·43	1·70
Gopeng ...	...	...	81·78	94	69	25	77·12	870	...	81	...	7·52	2·12
Ipoh ...	...	...	82·77	93	75	18	79·01	943	...	86	...	5·60	1·69
Kampar ...	...	...	...	93	73	20	...	...	...	...	..	11·28	3·45
Teluk Anson ...	...	...	82·93	92	69	23	78·61	921	...	82	...	7·13	2·25
Tapah ...	...	...	81·78	93	70	23	77·78	898	...	83	...	10·92	2·48
Parit Buntar ...	...	...	83·44	95	73	22	78·57	912	...	80	...	7·09	1·76
Bagan Serai ...	...	...	83·27	92	70	22	78·66	917	...	81	...	1·85	·89
Selama ...	...	...	82·36	93	73	20	78·42	920	...	84	...	11·48	2·19

STATE SURGEON'S OFFICE,
TAIPING, 13*th June*, 1906.

S. C. G. FOX,
Acting State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of May, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·886	153·3	80·9	90·5	72·0	18·5	76·9	0·849	74·3	80	S. E.	8·51	1·92
Pudoh Gaol Hospital „	...	...	...	...	...	...	...	...	...	...	...	7·20	2·03
District Hospital „	...	...	...	...	...	...	...	...	...	...	...	9·25	2·07
„ Klang	...	...	...	88·8	70·4	18·4	...	...	...	...	...	5·48	1·20
„ Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	8·70	1·77
„ Kajang	...	...	...	91·5	73·4	18·0	...	...	...	...	...	7·61	1·15
„ Kuala Selangor	...	...	...	...	...	...	...	...	...	...	...	4·65	1·20
„ Kuala Kubu	...	...	...	...	...	...	...	...	...	...	...	11·55	2·50
„ Serendah	...	...	...	92·5	69·0	23·4	...	...	...	...	...	10·38	2·71
„ Rawang	...	...	...	91·9	67·4	24·4	...	...	...	...	...	12·86	4·25
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	8·06	2·15
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	..	5·94	1·93

State Surgeon's Office,
Kuala Lumpur, 14*th June*, 1906.

E. A. O. TRAVERS,
State Surgeon, Selangor.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of March, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	94·0	66·0	20·96	...	...	...	...	...	4·71	·9
Raub ...	...	...	...	94·0	67·0	17·80	...	...	...	...	...	3·85	1·4
Bentong ...	...	...	...	93·0	69·0	17·48	...	...	...	...	...	4·81	1·4
Temerloh ...	...	...	...	93·0	70·0	16·80	...	...	...	...	...	3·53	1·3
Pekan ...	...	...	...	88·0	72·0	11·87	...	...	...	...	...	11·38	2·8
Kuantan ...	...	...	...	91·0	70·0	15·70	...	...	...	...	...	7·74	2·8

RAUB,
6th June, 1906.

W. H. FRY,
State Surgeon, Pahang.

Pahang.

Abstract of Meteorogical Readings in the various Districts of the State for the month of April, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis	...	...	...	96·0	68·0	19·63	...	...	...	...	...	8·84	1·34
Raub	...	...	...	95·0	70·0	18·55	...	...	...	...	...	6·49	1·15
Bentong	...	...	...	95·0	70·0	17·75	...	...	...	...	...	8 01	2·26
Temerloh	...	...	...	100·0	71·0	19·16	...	...	...	...	...	9·04	1·77
Pekan	...	...	...	90·0	72·0	12·56	...	...	...	...	...	6·50	1·65
Kuantan	...	...	...	93·0	70·0	16·03	...	...	...	...	...	9·99	2·76
Sungei Lembing	...	...	...	90·0	68·0	16·48	...	...	...	...	...	7·10	1·84

RAUB,

14th June, 1906.

W. H. FRY,

State Surgeon, Pahang.

The Duff Development Company, Limited, Kelantan.

Abstract of Meteorological Readings for the month of May, 1906.

DISTRICT.	Temperature.			Total Rainfall.	Greatest Rainfall during 24 hours.
	Maximum.	Minimum.	Range.		
	Mean. °F	Mean. °F	Mean. °F	Inches.	Inches.
Kuala Lebir ..	90·5	72·4	18·0	5·64	1·90
Ulu Liang ...	87·7	73·4	14·3	5·17	1·22
Serasa ...	91·9	71·6	20·3	5·27	1·65
Kuala Kelantan ...	88·4	75·1	13·3	2·07	1·12

SURGEON'S OFFICE,
5th June, 1906.

JOHN D. GIMLETTE,
Surgeon.

METEOROLOGICAL OBSERVATIONS.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the Month of April, 1906.

Date.	Temperature of Radiation.										Wind.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Clouds and weather Initials.			Rain.
											Direction.																	
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference sun and shade.	Grass.	Difference shade and radiation.	9 H	15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	21 H	9 H	15 H	21 H	Inches.
	°	°	°	°	°	°	°	°	°	°			°	°	°	in.	in.	in.	°	°	°							
1	81	82	81·5	83	72	11	147	64	...	...	S.E.	E.	74·2	77·	75·6	0·849	0·926	0·887	80	85	82·5	2	10	5	B	R	C	·22
2	75	76	75·5	76	72	4	145	69	...	...	E.	N.E.	73·3	74·3	73·8	·820	·848	·834	94	94	94·	3	10	2	C	R	B	1·55
3	82	91	86·5	93	71	22	149	56	...	...	E.	S.E.	75·3	77·	76·1	8·77	·960	·918	80	66	73·	2	10	3	B	R	C	·86
4	75	84	79·5	85	71	14	150	65	...	...	S.E.	S.E.	71·6	75·7	73·6	·774	·888	·831	89	76	82·5	10	5	5	R	C	C	·14
5	80	81	80·5	82	71	11	154	72	...	...	E.	S.E.	76·6	77·	76·8	·916	·947	·931	90	90	90·	2	0	0	B	B	B	
6	77	87	82	89	71	18	134	45	...	...	S.E.	S.E.	73·6	75·5	74·5	·829	·884	·836	89	69	79·	3	0	2	C	B	B	·22
7	85	86	85·5	87	71	16	150	63	...	...	S.E.	S.E.	75·	76·	75·5	·873	·904	·888	72	72	72·	0	0	2	B	B	B	
8	81	85	83	87	71	16	132	45	...	...	E.	N.W.	74·2	75·	74·6	·849	·873	·861	80	72	76·	0	3	10	B	C	R	·67
9	75	76	75·5	80	71	9	134	54	...	...	S.E.	S.E.	73·3	74·3	73·8	·820	·848	·834	94	94	94·	3	5	5	C	C	C	
10	78	83	80·5	85	71	14	132	47	...	...	S.E.	E.	74·6	74·7	74·6	·857	·856	·856	89	76	82·5	5	3	0	C	C	B	
11	80	86	83	88	72	16	150	62	...	...	E.	N.E.	76·6	74·	75·3	·916	·855	·885	90	68	79·	0	0	10	B	B	R	·03
12	77	88	82·5	89	73	16	147	58	...	...	S.E.	E.	75·3	73·3	74·3	·877	·819	·848	94	61	77·5	0	0	2	B	B	B	
13	83	92	87·5	94	72	22	145	51	...	...	S.E.	S.E.	74·7	79·1	76·9	·856	·994	·925	76	66	71·	0	0	0	B	B	B	
14	82	90	86	91	73	18	151	60	...	...	S.E.	S.W.	75·3	78·6	76·9	·877	·982	·929	80	69	74·5	0	0	3	B	B	C	
15	79	88	83·5	89	72	17	147	58	...	...	S.E.	S.E.	73·9	73·3	73·6	·839	·819	·829	85	61	73·	0	2	10	B	B	R	
16	80	83	81·5	83	72	11	145	62	...	...	E.	E.	76·6	78·	77·3	·916	·956	·936	90	85	87·5	3	2	5	C	B	C	·92
17	80	86	83	88	72	16	144	56	...	...	S.E.	S.E.	76·6	74·	75·3	·916	·855	·885	90	68	79·	5	2	5	C	B	C	1·65
18	77	87	82	88	72	16	140	52	...	...	E.	S.W.	71·9	73·9	72·9	·783	·837	·810	84	65	74·5	5	5	2	C	C	B	
19	80	89	84·5	91	72	19	149	58	...	...	S.E.	N.E.	73·3	84·1	78·7	·820	1·172	·996	80	85	82·5	0	0	0	B	B	B	
20	82	84	83	86	74	12	126	40	...	...	E.	S.E.	75·3	77·4	76·3	·877	·938	·907	80	80	80·	3	3	5	C	C	C	·05
21	77	85	81	85	71	14	120	35	...	...	E.	S.E.	73·6	80·	76·8	·829	1·026	·927	89	85	87·	0	3	2	B	C	B	
22	80	87	83·5	87	72	15	110	23	...	...	E.	S.E.	76·6	77·1	76·8	·916	·933	·924	80	73	76·5	2	3	2	B	C	B	·39
23	77	84	80·5	85	71	14	132	47	...	...	E.	E.	73·6	77·4	75·5	·829	·938	·883	89	80	84·5	10	5	5	R	C	C	·10
24	80	82	81	86	73	13	140	54	...	...	E.	S.E.	75·	75·3	75·1	·867	·877	·872	85	80	82·5	2	3	5	B	C	C	
25	78	80	79	81	73	8	145	64	...	...	S.E.	S.E.	74·6	78·3	76·4	·857	·968	·912	89	95	92·	2	2	10	B	B	R	1·16
26	82	86	84	86	72	14	144	58	...	...	E.	S.E.	75·3	76·	75·6	·877	·904	·890	80	72	76·	2	2	10	B	B	R	1·75
27	79	82	80·5	83	72	11	143	60	...	...	N.E.	S.W.	73·9	75·3	74·6	·839	·877	·858	85	80	82·5	2	5	5	B	C	C	·20
28	78	79	78·5	80	73	7	138	58	...	...	S.E.	S.E.	76·3	77·3	76·8	·906	·937	·921	94	95	94·5	2	10	10	B	R	R	·26
29	78	82	80	82	73	9	142	60	...	...	S.E.	S.E.	74·6	77·	75·8	·857	·926	.891	89	85	87·	2	3	10	B	C	R	·65
30	77	85	81	85	73	12	127	42	...	...	S.E.	S.E.	75·3	76·7	76·0	.877	·922	·899	94	76	85·	0	0	2	B	B	B	·02

Total 10·84

State Surgeon's Office,
Seremban, *17th May*, 1906.

R. VAN GEYZEL,
Apothecary.

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AGRICULTURAL BULLETIN

OF THE

STRAITS

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NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, &c. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valua-"tion regarding new or little known natural or manufactured pro-"ducts of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M.A., F.R.S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given.

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

No. 6.] JUNE, 1906. [Vol. V.

BANANA CULTIVATION.

BY Mr. A. HALE.

It has seemed to me for some years past, that Banana cultivation has not taken the place which it deserves amongst our planting ventures in the Malay States; so about a year ago I determined to start some experiments in growing Bananas under the most ordinary circumstances in the garden at my Official Quarters in Taiping. I think perhaps the results, even up to now, may be of a little interest. It must be understood that what I have done of course, runs the risk of not being carried on permanently, because Government Officers are often moved and their successors do not always interest themselves in the same hobbies. Some years ago I took a great deal of pains to plant an orchard of the best sorts of fruits at the back of my Official Quarters; I stayed in the same appointment long enough to eat the first Chiku which I had grown from seed; then I left, and the men who came after me did not care for gardening, so that my orchard got negelected and is I think, now overgrown with lalang.

Banana cultivation especially seems to me to appeal to us, because generally speaking, Government Officers stay in one post long enough to reap the benefits of their planting, and the results are eminently satisfactory in many ways. The plant is handsome and the fruit is a very good food, what the planter cannot eat himself is always acceptable to the people who inhabit his back premises. I have attached to this memorandum a record of my own planting; from the time I commenced in March 1905, up to the present date; the time has not been sufficiently long to show very important results, but I considered it better to publish it now, because I think that the Banana is one of the most important catch crops;—for those planters who believe in catch crops,—and is especially adapted for planting between rows of rubber trees. One does not expect a great profit from a catch crop under any circumstances; there are other reasons for planting such things as Bananas, besides that of obtaining actual returns in hard cash, very often indirect profits are as important as direct profits and, arguing on the principle that he is a benefactor to the human race who makes two blades of grass grow where one grew before, I expect the planter who made Bananas grow all over his cleared ground, and gave all the fruit away to his coolies, would be well repaid in the permanency and well being of his coolie staff; but I think also that such generosity is not yet called for and that the planter might reasonably expect to get a price for his produce, if only a small one; and that this return would help to pay for his weeding. I cannot think that the whole space between two rows of rubber trees, perhaps 16 feet, should be weeded carefully for six years and not produce anything; that seems a great waste of labour. As fruit and vegetable, the Banana is one of the most healthy foods obtainable in the east; but from a commercial point of view, undoubtedly the varieties producing fibre and those best adapted to flour making, should be planted.

Bananas are amongst the easiest of all plants to grow, they should be planted twelve to eighteen feet apart, and once planted, if they are kept mulched with grass and rubbish, especially during the dry season, they will continue to produce fruit from three to five years and great quantities of it. It is said that an acre of Bananas will produce enough food for 25 people, and I should think this is no exaggeration.

It is a most interesting plant to grow because of the great number of varieties, I do not suppose that the table attached to this paper contains more than half the names which could be collected, and there are very few of them that are not useful in one way or another; the Benjarese are great Banana growers and they have a way of drying the fruit gradually in the sun and over fires, until it becomes almost as tough and dry as a fig or date, in this state I expect it could be packed for exportation; if Bananas of good quality, like Pisang Mas or Pisang Ambun, are treated in this way they make a most delicious food and one very useful for carrying in the jungle

I can see no reason at all why the wild pisang of the Peninsula should not be planted, it produces a good fibre and would I am sure compete with the Manilla hemp.

The last word has surely not yet been said concerning Banana flour, it would surely be worth a planter's while to make some experiments in this direction; when it is remembered that some of the African tribes live almost entirely on roughly prepared cakes, made of badly dried and dessicated plantains, it seems as if there is a good line for another food stuff, which could be produced nowhere cheaper than in these States.

A. HALE,

District Officer, Larut and Krian.

TAIPING, PERAK,

June, 1906.

RECORD OF BANANA CULTIVATION DURING 1905 AND 1906.

Serial No.	NAME.	Planted.	First appearance of fruit.	Gathered.	REMARKS.
1	Pisang Manta ...	29.3.05	...	...	
2	Do. Jari Buaya ...	29.3.05	5.10.05	30.1.06	Small bunch of small fruit, good sub-acid flavour.
3	Do. Raja ...	29.3.05	...	...	
4	Do. Jelai bunga ...	15.6.05	...	...	
5	Do. Udang ...	29.3.05	...	...	
6	Do. Lemak Manis ...	16.7.05	...	...	
7	Do. Rastali ...	29.3.05	17.12.05	25.3.06	Very valuable desert fruit and good cropper.
8	Do. Balalai ...	29.3.05	17.12.05	22.5.06	Photographed 14.2.06. Bunch contained over 1,500 fruits but only one third filled out, small angular fruit, thick skin, not very good flavour. Pisang Raja flavour.
9	Do. Liling ...	29.3.05	7.11.05	30.1.06	I think this name is wrong. Gathered 2nd fruit 12.6.06.
10	Do. Pahit ...	29.3.05	...	...	
11	Do. Abu Besar ...	10.5.05	7.2.06	2.6.06	Large bunch of large angular fruit skin turns black as it ripens, a cooking variety.
12	Do. Kelat Ayer ...	16.7.05	...	...	

RECORD OF BANANA CULTIVATION DURING 1905 AND 1906.—*Continued.*

Serial No.	NAME.	Planted.	First appearance of fruit.	Gathered.	REMARKS.
13	Pisang Changi Putri ...	29.3.05	15.3.06	...	The original plant (ibu as the Malays call it) died, but three new shoots started round it, a second fruit appeared on 2.4.06 and a third on 24.5.06, all good bunches of fruit.
14	Do. Kladi ...	16.7.05	28.3.06	3.6.06	
15	Do. Susu ...	16.7.05	...	...	
16	Do. Kernia ...	29.3.05	18.11.05	5.2.06	Good flavoured fruit large bunch, Pisang Raja type. Second fruit appeared 25.5.06. Third fruit appeared 28.5.06.
17	Do. Toman ...	10.5.05	22.2.06	5.6.06	A very large and valuable fruit, good flavour. The bunch contained 51 fruits average length 10 inches and girth 7 in.
18	Do. Buloh ...	29.3.05	11.5.06	...	
19	Do. Kra or Kara ...	16.7.05	22.2.06	8.5.06	Very small and low plant and very small fruit, good flavour, Pisang Mas type.
20	Do. Susu ...	29.3.05	...	...	
21	Do. Benggala ...	29.3.05	...	...	Large and tallest of all the pisang yet planted.

RECORD OF BANANA CULTIVATION DURING 1905 AND 1906.—*Continued.*

Serial No.	NAME.	Planted.	First appearance of fruit.	Gathered.	REMARKS.
22	Pisang Pendik ...	10.5.05	...	28.5.06	Wrongly named.
23	Do. Mundan ...	10.5.05	6.5.06	...	
24	Do. Jarum ...	10.5.05	4.1.06	19.3.06	Large bunch, long thin fruit, good flavour sub-acid.
25	Do. Siasam ...	10.5.05	17.4.06	...	
26	Do. Ambun ...	10.5.05	6.3.06	...	
27	Do. Berangan ...	10.5.05	6.3.06	...	
28	Do. Rastali ...	10.5.05	...	...	
29	Do. Alang ...	10.5.05	25.3.06	...	The first bearing stem was blown over by a gale before the fruit ripened, fruit similar to Pisang Tandok.
30	Do. Kabatu ...	10.5.05	25.4.06	...	The leaves of this plant are valuable for wrappers, being tough and not liable to split.
31	Do. Minyak ...	10.5.05	18.1.06	25.3.06	Average quality.
32	Do. Awak ...	10.5.05	15.2.06	...	
33	Do. Sarendah ...	10.5.05	29.11.05	1.2.06	Average quality.
34	Do. Kelat Jawa ...	10.9.05	...	...	
35	Do. Keladi ...	11.9.05	...	...	
36	Do. Nangka ...	11.9.05	...	...	

RECORD OF BANANA CULTIVATION DURING 1905 AND 1906.—*Continued.*

Serial No.	NAME.	Planted.	First appearance of fruit.	Gathered.	REMARKS.
37	Pisang Ambun	11.9.05	...	...	
38	Do. Bunga	11.9.05	...	...	
39	Do. Asam Kling	11.9.05	1.6.06	...	Dark red leaf stalks.
40	Do. Berasak	11.9.05	...	...	
41	Do. Jelai	11.9.05	...	...	
42	Do. Balalai	7.10.05	...	...	Plant from Number 8.
43	Do. Jari Buaya	25.10.05	2.5.06	...	
44	Do. Kerachi	19.12.05	...	...	
45	Do. Ekor Kuda	19.12.05	...	...	
46	Do. Gading	19.12.05	...	...	
47	Do. Mas Besar	19.12.05	...	...	
48	Do. Bakar	19.12.05	...	...	
49	Do. Manta Mas	19.12.05	...	...	
50	Do. Kelat Raja	19.12.05	...	...	
51	Do. Kepi	30.4.06	...	...	
52	Do. Lang	30.5.06	...	...	
53	Do. Moris	19.12.05	...	...	
54	Do. Changhi Putri	19.12.05	...	...	
55	Do. Malinje	19.12.05	...	...	
56	Do. Rendang	17.1.06	...	..	
57	Do. Kelat Benar	17.1.06	...	...	

RECORD OF BANANA CULTIVATION DURING 1905 AND 1906.—*Continued.*

Serial No.	NAME.	Planted.	First appearance of fruit.	Gathered.	REMARKS.
58	Pisang Abu Batu ...	17.1.06			
59	Do. Relong ...	17.1.06			
60	Do. Langlong ...	30.5.06			
61	Do. Raja ...	17.1 06			
62	Do. Rasak ...	17.1.06			
63	Do. Minyak ...	17.1.06			
64	Do. Awak Legor ...	17.1.06			
65	Do. Talas ...	17.1.06			
66	Do. Masak Hijau ...	17.1.06			
67	Do. Sarendah ...	17.1.06			
68	Do. Mas ...	17.1.06			
69	Do. Abu Taba nior ...	30.5.06			
70	Do. Kelat Barat ...	30.5.06			
71	Do. Awak Kling ...	30.5.06			
72	Do. Tuntong ...	30.5.06			
73	Do. Awak betul ...	30.5.06			
74	Do. Abu Kling ...	30.5.06			
75	Do. Pipit ...	30.5.06			
	Do. Kapal	Not yet obtained.			
	Do. Rendak				
	Do. D'Almeida				

Record of Banana cultivation during 1905 and 1906.—*Concluded.*

Serial No.	Name.	Planted.	First appearance of fruit.	Gathered.	Remarks.
	Pisang Kakabu	Not yet obtained.			
	Do. Hyam				
	Do. Kili				
	Do. Rayunan				
	Do. Agong				
	Do. Raksa				
	Do. Abu				
	Do. Kapit				
	Do. Awak taba Nyor				
	Do. Jejor				
	Do. Lalang				
	Do. Achih				

MALAY DRUGS.

In 1894 I read before a meeting of the Medical Society a paper in the *Malay Materia Medica*, which was published in the journal of that Society. A comparatively small number of copies were printed and the paper is now practically unprocurable, I have therefore thought well to reproduce it in main part adding additional information on the drugs used by the Malays as far as I have been able to collect information on them.

The difficulty of studying the locally used drugs lies largely in the fact that they are imported from the forests to the shops often in the form of chips of wood, twigs, or roots, quite unidentifiable, and though the Native name is often of much use, yet one can never be quite sure even that that is used correctly by the drug-seller. In the villages one often can get hold of a man who really knows the plants which are used, but frequently I have found no one in the place who is acquainted with the Native medicines. There is a tendency too for this lore to die out as European medicines are now more universally procurable at the various dispensaries now scattered over the Peninsula. The old herbalist's occupation dwindles away and soon the knowledge is lost. This has happened in all countries where civilization and scientific medicine have invaded the country districts.

The best herbalists are the Jakuns and the Sakais who have to depend on the forests for their medicine as well as their food, and who also used to trade in the drugs valued by the Malays and Chinese.

The country Malay's knowledge of human physiology and anatomy is naturally very limited and his nosology almost as scanty. He is acquainted with conspicuous and easily determined diseases such as dysentery and small-pox, and seems to know something about these ailments, but obscurer diseases as heart disease, hysteria and till it was common, consumption were always referred to witchcraft or the action of devils, and treated as such.

Indeed in examining the Malay pharmacopœia one cannot help being struck with its resemblance to that of England five centuries ago. We have the uses of various portions of animals such as the Slow Loris, Kangkong (*Nyctipithecus*) shown to be worthless as drugs long ago. We have the same ideas that this or that plant with the addition of rose water or pepper will serve for any illness that may occur. We have the sacred herbs brought from Mecca, of which the most popular is the Rose of Jericho (*Anastasia hierochuntica*) which being brought from Mecca as a flower from Eve's grave is supposed to have marvellous properties. Another popular remedy from Mecca is Water from the well of Zem-zem, a well at which probably many millions of people affected with Cholera and other disease have bathed for generations. Bottles of this filthy liquid are brought back by pilgrims and used as valuable medicines.

The Rose of Jericho is immersed in water and when it expands the water is given to patients to drink. In the same way texts of the Koran are written on a special kind of paper and plunged in water which the patient drinks.

Chewing betelnut while reciting verses of the Koran and spitting afterwards on the head of the patient is considered very valuable, and there used to be a man in Singapore who made his living by doing this cure.

Again we have traces of the Doctrine of Signatures so popular in the middle ages in Europe as illustrated by the use of *Balanophora* as an aphrodisiac. This plant occurs on Mount Ophir and in Semangko Pass and elsewhere at high elevations, and is sought for its peculiar appearance suggesting its use. Strongly scented or flavoured-plants are of course in great repute and as in many cases the scent or flavour is due to some active principle, some of these may perhaps be found invaluable additions to the pharmacopœia.

Many popular Native medicines seem to have no definite properties at all, or if they have any principle it is so weak or it is used in such small quantities that it is very difficult to imagine their being of any real use. Others such as Pegaga (*Hydrocotyle asiatica*) and *Cassia alata*, possess well known properties when fresh, and are in use all over the regions in which they grow, but it has not yet been found possible to preserve them in a state fit for use. They require to be used in a fresh state.

A certain number of the plants commonly used here by Natives have evidently valuable properties but have never had a fair trial or have been rejected as not giving good results when tested in Europe. In the latter case, I believe that this is often due to bad preparation of the samples, or the principle may be destroyed in drying or otherwise preserving the drug, as in the case of Gambir leaves which though when fresh and green contain abundance of tannin become brown and lose every trace of it a few hours after gathering.

Some drugs of value having been analyzed in Europe having not shown any signs of a distinct alkaloid, though distinctly valuable medicines, have not yet found their way into the drug trade. One such is Kosam, *Brucea Sumatrana.* This has undoubtedly a good effect in many forms of dysentery. No alkaloid has been found in it and it has not been commercially successful. *Roucheria Griffithiana* is another plant, the bark of which is used by the wild tribes as a dart poison and said to be highly effective, yet no definite principle appears to be found in it.

Enemata and injections of any kind are quite unknown to Malays who indeed would be afraid to use any such operations. They are very fond of external applications either stimulant or cooling and a large number of leaves of different plants are used to cure headaches by application, or to poultice boils, or to allay he pains of rheumatism.

They are very partial to baths in which various substances are steeped and are especially particular as to the bath used after confinement into which decoctions chiefly of astringents are poured. In some cases the patient is smoked and this is used when he is possessed or under the influence of evil spirits. Thus when a child suffers from "Sampuh Pachut," that is to say persistently cries and will not take its food it is treated in the following way:—The leaves of *Hedyotis congesta*, Br., a tall jungle weed known as "Lidah Jin" or "Poko Sumpuh Pachut" are boiled with some other leaves till one-third of the liquor is evaporated and the decoction exposed to the dew for a night and the child is bathed in it; or a quantity of chewed sugar-cane, dead leaves and other roadside rubbish is boiled and the child is bathed in the decoction, and is then smoked over a fire made with a weaver-bird's nest (Sarang Tampur), the skin of a bottle gourd (Labu) and a piece of wood which has been struck by lightning. The disease is supposed to be due to the influence of devils which are by these means expelled.

Emetics are popular, and the actual cautery for intractable wounds especially punctured wounds is sometimes used. A bit of wick or rag is dipped in coconut oil and lighted and the burning oil allowed to drop on the wound. I have seen a bad bamboo cut which resisted all ordinary treatment heal up very speedily after this operation which the patient declared did not hurt as much as one would expect.

I classify the drugs according to uses but it must be remembered that a Malay medicine rarely consists of a single drug and one celebrated medicine contains a hundred different ingredients. I add also notes on the cultivation or properties of the various drugs. I have incorporated notes on Malay medicine from a paper published in the Bulletin of Pharmacy in March, 1892, p. 108 by Mr. HOLMES. The list of Native remedies with their scientific identifications he states he owes to Mr. J. MELDRUM of Johor. Most of them are certainly correct, but in several cases the Native names are identified with those of plants which do not occur in the Peninsula. I have omitted these as they are obviously incorrect.

Two excellent papers on Yaws, (Therapeutical Society, 1905) and Datura Poisoning in the Federated Malay States, (British Medical Journal, May 16, 1903) were published by Dr. GIMLETTE, to whom I am also indebted for specimens of drug-plants used in Kelantan.

APERIENTS.

The common aperients in use here are Castor-oil (Jarah) purging nuts. *Jatropha Curcas*, Jarah B'landa, Croton oil. Aloes and Senna leaves (Sena Maki) *Cassia Angustifolia*, Vahl.

Castor oil, *Ricinus camunnis* occurs as a weed here and there in cultivation, but has never been cultivated to any great extent in the Straits. Experimental cultivations were made in the

Malacca Gardens and also in the Singapore Botanic Gardens. It is easily grown and fruits readily and abundantly, but cultivations are always marred here, as often elsewhere by plagues of caterpillars (Bulletin O. S. 266) which speedily reduce the leaves to skeletons. It might however, come in as a catch crop for rubber, as it is of rapid growth and fruits in about six months. A little is grown by Malays for local use. Their method of preparing the oil is, I am informed, to boil the seeds and pound them up in water, afterwards skimming off the oil.

Jatropha curcas.—The purging nut is commonly grown as a fencing plant, cuttings growing readily and making a rather poor but quickly raised fence. The latex of this plant stains clothing of a dirty grey, and clothes put out to dry on this kind of hedge, not rarely used by the washermen, are apt to get spoiled. The seeds are rather too strong and irregular a purgative for general use, and it has never been used as a medicine by Europeans. The drastic part of the seed is said to occur in the embryo and it is said that if this is removed four or five of the seeds may be used as a gentle and safe purgative.

"The leaves are rubefacient and used in India to produce a flow of milk, and the juice of the stem is applied as a styptic and said to be excellent."—(*Watt's Dictionary*).

Croton oil, *Croton Tiglium* (*Euphorbiaceæ*) is seldom cultivated. Plants occasionally are to be met with in Native gardens. It is an easily grown shrub, and fruits readily. Seeds are imported apparently from Java chiefly, but there is little demand for it, the oil being so drastic that it is but little used and only in small quantities. The Natives know its properties well and use it for poisoning. grinding up the seed and sprinkling it over food.

Aloes are imported and used in the ordinary way.

Senna (Sena Maki) is the dried leaves of *Cassia augustifolia*, Vahl.

The leaves of this plant are imported from Arabia, and a decoction is made of them which is drunk. As it is supposed to come from Mecca it has a semi-religious value, and in combination with other substances is supposed to be good for all kinds of sicknesses. The leaves are ground to powder and sifted and the weight of three drachms is a dose. The following is an account of its use from a Malay manuscript:—

Article for the use and method of taking Senna Maki leaf, bark and stem which are famous for their use and success by eminent native doctors. In the first place, take the Senna bark, leaf and stem together, and pound them into powder and sift it. To take it for a dose let it be weighed three dirhems and mix it with any of the following mixtures as the case of the sickness may require:—

1 If taken with rose water it will cure disease in the chest.
2 If taken with sugar it will expel cold from the body and act as an aphrodisiac.

3 If taken with sugarcandy it will strengthen the bones and abdomen.

4 If taken with ghee and sugar for three mornings it will remove venereal disease.

5 If taken with fresh butter it will cure headache and moisten the brains and remove offensive odours from the mouth.

6 If taken with preserved milk it will expel poison and the same will not be dangerous.

7 If taken with goat's milk it will strengthen the body and add to virility.

8 If taken with dates it will remove offensive odours from the mouth and give a good appetite.

9 If taken with pomegranate, the older the body the stronger it will become and it will also bring health and appetite.

10 If taken with raisins it will brighten the eyes from dimness.

11 If taken with vinegar it will cure ague and all diseases in the stomach will disappear.

12 With lime-juice it will remove the heat of the stomach and make a lean person stout.

13 If taken with dew, it will increase the brightness of the eyes.

14 If taken with a decoction of pomegranate rind it will cure dysentery.

15 If boiled with water of a young coconut it will cure urinary diseases and remove gravel by God's will.

The long nutmeg, *Myristica fatua* is imported here from the Moluccas in large quantities, probably for the manufacture or adulteration of nutmeg butter. The seeds pounded are used as a purgative either alone or in combination with Senna.

Castanopsis javanica A. Del. (Cupuliferæ) "Brangan Gajah" The large oblong seed of this chestnut was I was informed by Malays very purgative, in small quantity producing flatulence, others have told me it could be eaten with impunity and was good. It has a distinctly bitter taste.

Portulaca oleracea the Purslane (Gelang Pasir) a common succulent weed often used as a vegetable and commonly collected for that purpose is said to be aperient when combined with the little aromatic weed *Linmophila villosa*, Burth.

Acalypha indica (Euphorbiaceæ) "Cheka Mas". A weed about a foot tall with inconspicuous green flowers very common in waste ground. This is used as a purgative by the Malays, two or three bunches of the leaves are boiled in water and the decoction drunk. In the Indian Pharmacopoiæ it is suggested to use it as a substitute for Senega.

The expressed juice of the fresh leaves is said to be a safe emetic for children, in India, and the root is used as a purgative (*Watt's Dictionary.*)

Cassia alata (Leguminosæ) Daun Gelenggang best known as an application for ring-worm *(See* skin diseases) is used as a mild purgative. A decoction of the leaves in water being given.

Mirabilis Jalapa, Adans. (*Nyctagineæ.*) The Marvel of Peru. "The seeds are given as a mild aperient in doses of 5 to 20 grains" (Holmes) who gives the Native name as Bunga Serunei which properly belongs to *Wedelia biflora.*

The plant is not of course wild in the Straits being of South American origin but is occasionally cultivated as an ornamental plant. As an aperient it appears to be feeble, and uncertain: according to *Watt's Dictionary*, and in India is chiefly used to promote suppuration.

esbania grandiflora, Pers. (*Leguminosæ*). The leaves according to Holmes are used as an aperient in the form of an infusion. It is probably very mild as the leaves are a popular vegetable here, Lisboa (*Watt*'s *Dictionary*) says that when taken very freely they produce diarrhœa.

ASTRINGENTS.

The Malay suffers much from dysentery and diarrhœa often due to way of gorges on unripe fruit, so that medicines for these complaints are in much request and a great number are reported valuable. Most of them are astringent and probably contain tannin. The most important of these are the following.

Carapa moluccana, Gaertn—Nireh bark. The bark of this common mangrove swamp tree easily known by its large brown cannonball like fruit, has long been used. The best method of preparing it is to boil the bark for two hours in a copper pan, then after straining to continue boiling till the decoction has become thick and then to dry off by slow heat. It forms a crystalline mass of a deep brown colour soluble in water and spirits of wine. It should be dissolved in spirits and two teaspoonfuls given in water every day. It has a high reputation in dysentery and seems to be well worth the attention of pharmacists.

Garcinia Mangostana, L. Mangosteen husks. The rinds especially of the unripe fruit is used. Treated in the same way as Nireh bark, it gives a very similar extract. The dried rinds are sold in the drug-shops and a quantity are exported to China. The roots are used in dysmenorrhœa also.

Melastoma Malabathricum, L. var. *polyanthum* The Senduduk or Singapore Rhododendron. The young shoots of this very common shrub are boiled and the decoction administered alone or in combination with extract of mangosteen husks, mixed with Sumbong leaves (*Blumea balsamifera*) it is employed as a bath for flatulence and acidity and tenderness of the legs (Kelantan—Dr. GIMLETTE.)

Mimusops elengi, L. (*Sapotaceæ*) "Bunga Tanjong" "The flowers and bark are used as an astringent tonic and febrifuge in fever and diarrhœa," (Holmes). The bark and unripe fruits are used in India as astringents for dysentery, discharges from the urinary organs, relaxed gums, and other cases where astringents are required.

Flacourtia Rukam (*Bixineæ*) The Rukam a well-known little fruit. HOLMES in his paper on *Malay Materia Medica* gives "Buah Rokam (*Sphoerocarya moschifera*) (*Juglandaceæ*)" The juice extracted from the bruised fruit is given as an astringent in diarrhœa and dysentery. The *Sphœrocarya* (*Pyrularia moschifera*) does not occur here, but the young fruit of the Rukam (*Flacourtia*) is certainly very astringent, and is perhaps used as stated by Mr. HOLMES.

Anona reticulata (*Anonaceæ*). "Nona" The powdered bark is given in doses of 5 to 10 grains as an astringent in diarrhœa and dysentery" (Holmes.)

Musa paradisiaca, L. (*Musaceæ*) "Pisang Batu. The juice extracted from the root after it has been pounded with a little saffron (*i.e.* turmeric) with the addition of a little opium is given in teaspoonful doses as an astringent for acute dysentery" (Holmes).

Casuarina muricata, Roxb. (*Casuarineæ*) a decoction of the bark is used as an astringent tonic in diarrhœa and dysentery like that of *C. equisetifolia* in China (Holmes).

C. equisetifolia is the only species of *Casuarina* here and is no doubt the plant intended. It is given as a synonym in the Index Kewensis.

Triumfetta angulata, Lam. (*Tiliceæ*) "Pulut pulut." The leaves are boiled in a decoction of rice and the mixture is given as an astringent after dysentery and on debility (Holmes).

"Pulut pulut" is the name of *Urena lobata.*

Plantago Ispaghula, Roxb. (*Plantagineæ*). The seeds are used as in India for diarrhœa (Holmes). The plant does not occur here, but the seeds are imported from India. I have failed to raise it from seed here.

Ancistrocladus extensus, Var. *penangianus*. "Akar Julong hitam." A woody climber not rare in sandy places near the sea. The roots are used for dysentery.

Pomegranate, *Punica granatum*, L. (*Lythraceæ*). The bark of the roots is used for diarrhœa, but its most important use is for tapeworm, for which it is a well known drug.

Morinda citrifolia, L. and *M. tinctoria*, Roxb. (*Rubiaceæ*). "Mengkudu." A decoction of the bark of these trees is used as an astringent. It is rather coarse and strong. The roots were formerly used as a dye. It is also used in ague, which see.

Hedyotis capitellata, Wall. (*Rubiaceæ*). "Akar Sutnibut," "Akar Kemeniyan Hantu." A common climbing herb. A decoction of the roots is used for dysentery.

H. glabra, Br. "Rumput Sibuch." A common herb, the whole plant is used.

Gynura sarmentosa, Del. (*Compositæ*), "Kula Mayi Merah," "Akar Subiak." A climbing herb with purple involucre and yellow flowers. A decoction of the roots is used.

Didymocarpus reptans, Jack (*Gesneraceæ*), "Akar Sumpuh Darah," (lit. Dysentery root). A creeper with violet or white flowers common in forests. Nothing is known of its properties.

Nepenthes Reinwardtii, Miq. (*Nepenthaceæ*) "Priok Kra Betina." One of the common pitcher plants. A decoction of the roots is used.

Cyathula prostrata (Amarantaceæ) "Jarang-jarang." A common village weed, a decoction of the roots given for dysentery.

Lygodium scandens, L. "Ribu-ribu." A very common climbing fern, the stem and frouds of which are boiled and the decoction administered for dysentery and hoemoptysis, an ounce is taken in sweetened water.

Polyporus sanguineus (*Fungi*). "Chendawan Merah." A common bright red fungus often to be seen on dead timber, is boiled and the decoction administered generally in combination with that of other plants.

HOLMES states that the powdered fungus mixed with Eau de Cologne is used to disperse leprous tubercles and that in Brazil it is given in hoemoptysis.

Ægle marmelos (*Rutaceæ*) Bael-fruit. "Bila." Malay. This well known antidote for dysentery is usually imported here from India. The tree is cultivated here and there, and at one time trees were planted at the Police Stations in Malacca, by the Resident so that the villagers could obtain the fruits when required. An excellent idea which might be more generally adopted. The tree fruited well in Malacca, but it has failed to fruit in Singapore Botanic Gardens. In dryer places near the sea it might do better. It is easily propagated from cuttings, and throws up root shoots regularly. It is said however, by Natives, that plants grown from cuttings do not fruit.

The supply of this drug in the Native shops is not overlarge, as on one occasion when it was badly required, I was quite unable to get anywhere, the crude drug or any of its preparations.

Gambier, *Uncaria Gambir*. The ordinarily prepared extract is used in combination with other astringents, Gambir is also used in European medicine, as an astringent, for chronic diarrhœa, and dysentery Uterine Hœmorrhage and mucous discharges, also as an ointment for Ulcers, and to stop bleeding at the nose, leucorrhœa, etc. In the form of lozenges it is used for relaxed uvula, by singers and speakers. It is known as pale catechu in English Pharmacopoieas.

Kosam, (*Brucea sumatrana*) the Bidara Pahit, does not seem to be used to any extent by Malays at least as a dysentery medicine though it is known to the Chinese and sold in the shops for this purpose. It has been already described and figured in the Bulletin. The Javanese use the leaves as a substitute for an adulterant for opium when they smoke it, all on account of its bitter taste suggesting opium.

Rubus moluccanus L. (*Rosaceæ*) Akar Kupor; Tempo ranak. The common wild raspberry. A decoction of the roots of this plant is used for dysentery like that of *R. Canadensis* in America.

Decaspermum paniculatum Kurz. (*Myrtaceæ*) "Kelintek Nyamok," a small tree of which the leaves are chewed with betle nuts for dysentery.

Uraria crinita Desv. (*Leguminosæ*) "Poko Ekor Kuching," The Malay Lupine. A small shrubby plant with blue flowers in a thick spike, the roots are used for diarrhœa.

Capsicum fastigiatum, Bl. Chilis are given in cholera, dyspepsia and diarrhœa.

Piper nigrum, L. (*Piperaceæ*) Black Pepper, during a scare of cholera there was a great demand for oil of pepper among the Natives who considered it a specific.

Anisophylleia disticha (*Legnotidae*) "Lambei Ayam." An infusion of this plant is used as an astringent in diarrhœa and dysentery (Holmes).

Pithecolobium confertum, Benth. (*Leguminosae*). A common tree. An infusion of this leaves is used as an astringent in diarrhœa (Holmes).

Citrus acida (*Rutaceæ*) "Limau Nipis." The small common lime. A decoction of the ground up-roots used for dysentery.

STOMACHICS.

Hydrocotyle asiatica, L. (*Umbelliferae*) "Pegaga." A very common creeping herb with round leaves, abundant in waste ground and grassy spots. This herb is much valued by Natives, and women may often be seen collecting it for sale. Considerable quantities being brought into Singapore. It is used in curry as well as in medicine. The leaves pounded on a stone and put in a cup of water and allowed to stand for some hours is a decoction of some repute in cases of consumption; it is also used in liver complaint.

A decoction of the leaves is also used in leprosy and syphilis as in India and Mauritius in doses of half to one ounce, and the leaves are used as a poultice. The dried leaves in powder are given in doses of from 5 to 10 grains in catarrh and cough of children (as is *H. ro undifolia*). The peculiar body called Vellarin to which the properties appear to be due is an oily nonvolatile liquid soluble in spirits of wine and in ammonia. An alcoholic extract of the plant contains much tannin which accounts for the use of the plant in India for the bowel complaints of children. As Vellarin has not been found in the dry leaves, it is evident that a tincture made from the fresh plant would be the most effective preparation. That the plant possesses active properties in the fresh state and is useful in skin diseases there can be little doubt."—(Holmes).

Besides these several uses, it is in use in Singapore for bloody urine. It is ground up and mixed with alum and water, and the decoction drunk. This is known as Ubat Kinching Darah.

Rourea fulgens, Planch. (*Connaraceæ*) "Semilat." A big woody climber with very twisted brown stems and small deep green leaves which being of a beautiful pink colour when young give the plant a charming appearance. The flowers small and white. The roots of this have a great reputation for stomach-ache, a decoction being used, Holmes under the name Daun Rajah Kayu, says a decoction of the roots is used in leprosy, and an allied species *R. santaloides*, Dalz. is used in India as a bitter tonic in scurvy rheumatism, pulmonary complaints and diabetes.

Cnestis ramiflora, Griff. An allied plant is also used for stomach-ache. A decoction of the roots is given.

Sterculia scaphigera (*Sterculiaceæ*) "Kembang Samankok".

The seeds of this magnificent tree are imported into Singapore for sale in the drug shops where there is a good demand for them. When steeped in water the testa produces a large quantity of mucilage, which contains bassorin, so that one seed will fill a cup whence the native name of Fill-cup. One or two seeds are put into a cup of water overnight with a little sugar candy and the mucilage which somewhat resembles cold boiled sago is eaten on rising in the morning. This pleasant medicine is supposed to clear the stomach and cool the blood.

The tree is not rare in Singapore and there are two or three in the Garden jungle. It attains a considerable size 60 to 100 feet, and produces in shedding its leaves corymbs of small white flowers. The seed is oblong and grey about an inch long and borne in one corner of a large green boat shaped carpel.

Cleome viscosa, L. (*Capparideæ*) "Mamun." A common weed somewhat pungent in taste. A decoction of the whole plant is used in colic. The seeds used as an anthelmintic in India and the juice of the leaves mixed with oil poured into the ears to relieve deafness.

Coriandrum sativun, L. Coriander seed. Jintan, is used also as a carminative as it is everywhere, as are also the rhizomes of kunchur *Koempferia Galanga*, and Ginger rhizomes. These are pounded and the juice drunk. Ginger and kunchur are both cultivated; coriander seed, used in curry is imported.

Dysophylla auricularia (*Labiatæ*). A kind of wild mint "Ekor Kuching" mixed with chunam (lime) is rubbed on the navel for colic and supposed to be beneficial.

Callicarpa longifolia, Lam. "Tampoe besik" (*Verbenaceæ*). A common shrub with violet flowers and white berries. The leaves used for colic.

Bridelia tomentosa, Bl. "Kenidei" (*Euphorbiaceæ*). A large shrub common in damp grounds. A decoction of its leaves used for colic.

Ficus recurva, Bl. (*Urticeœ*) Akar Dahara. A climbing fig. A decoction of the leaves is used for colic.

Parkia Roxburghii, Don. (*Leguminosœ*) "Kedawung." A big tree of which the seeds are used in place of peppermint, as a medicine for colic.

Blumea balsamifera, Dec. (*Compositæ*) "Sembong." A coarse tall herb about 6 feet or more tall with yellow flowers. It has a strong camphoraceous odour and is the source of the Chinese Ngai Camphor. It is employed in combination with other drugs for various diseases and given alone for stomach-ache. It is also used to put into the bath after confinement. The dry leaves powdered to dust are blown up a horse's nose in cases of cold.

The plant contains an oil strongly scented of camphor and rubefacient.

(*See* Bulletin Vol. III, p. 23, 1889.)

Ardisia complanata, Wall., and *A. odontophylla*, Wall. "Sumpuh Lumpuh," "Pasal." (*Myrsineæ*) Jungle shrubs with pinkish flowers, the second one quite a small plant of which a decoction of the leaves is used for colic.

Blumea chinensis "Tombak-tombak." A weed the roots of which are boiled and the decoction drunk for colic.

Microglossa volubilis (*Compositæ*) "Ragin" is also used in the same way.

Vernonia cinerea, L. (*Compositæ*) "Rumput Sabagi," Sembong hutan, Tombak bukit. A common weed every where in waste ground with violet flowers. A decoction of the plant is used for diarrhœa, and of the leaves for colic.

Eclipta alba, L. (*Compositæ*) "Rumput Nigus," "Kurumak jantan."

A decoction of this plant, a common little weed in waste ground with small white flowers is used for colic. It is also used rubbed up in coconut oil to stimulate the growth of the hair under the name of "Ubat Rambut Panjang."

Labisia pothoina, Lind. (*Myrsineœ*) "Akar Fatimah," "Pinggan," "Mata Pelandok Rimbah." A small shrubby jungle plant with pink flowers and scarlet berries. Common in the forests, is used in the form of a decoction of the leaves for bowel complaints and a decoction of the roots for gonorrhea, also for menorrhagia, which see

Artemisia vulgaris, L. (*Compositæ*) Heeiya. This worm wood is cultivated by the Chinese and apparently introduced from China. It is used in cases of colic and a decoction of the leaves for washing sores.

Gynocthodes sublanceolata, Miq. (*Rubiaceæ*) "Sulong Akar." A common hedgerow climber, the roots and leaves are given as a decoction for stomach-ache, as are also those of *Coptosapelta*

Griffithii, "Akar Sampu Puchut," Akar Malong." A climber with sweet scented white flowers.

Hedyotis congesta Br. (*Rubiaceœ*) "Lidah Jin." A tall herb with small white flowers growing in woods, is administered for colic.

Canthium angustifolium, Roxb. (*Rubiaceœ*) "Akar Surumat" A decoction of the roots is used for colic. A climbing shrub apparently allied to the above-mentioned species, but not described in the materials for a Flora of the Malay Peninsula.

Mussænda glabra, Wall. "Balik Adap" (*Rubiaceœ*). The leaves are made into a tea for bowel complaints and also for coughs.

Adenosma coeruleum, Br. "Timbah tasek" and *A. capitatum* Benth. "Kuching-kuching" (*Scrophularineæ*) Aromatic herbs with blue flowers. The roots are boiled and the decoction given for colic.

Amomum Cardamomun, L. (*Scitamineæ*) Siamese Cardamums, and Ceylon Cardamums, *Elettaria Cardamomum* are used for flatulence and colic. Both of these are imported, as the plants do not fruit satisfactorily here. Both have been cultivated in the Botanic Gardens in Singapore, and have flowered regularly, but the squirrels eat off the flowers of the Ceylon Cardamoms, and prevent its fruiting.

Gastrochilus pandurata (*Scitamineæ*) "Temu Kunchi." The rhizomes of this little ginger are popular as a stomachic. It is a slow grower and is not very easy to cultivate so that its rhizomes are rather expensive.

Zingiber officinale, L. (*Scitamineæ*) Ginger "Haliya." The fresh rhizome crushed in a cloth and the juice squeezed into a spoon and drunk is a well known remedy for colic.

Bœhmeria nivea, Hook. (*Urticaceœ*) Rami. A decoction of the roots and leaves is used as a tonic in cases of dysentery. HOLMES suggests that it like the common nettle of Europe possesses styptic properties.

Curcuma longa, L. (*Scitamineæ*). Turmeric. Kunyet is used in doses of 5 to 10 grains as a carminative and antispasmodie in diarrhœa and dysentery (Holmes), it is added to all kinds of medicines by Malays.

C. zerumbet, Roxb. (*Scitamineæ*). The decoction of the rhizome is given as a tonic and stomachic for indigestion (Holmes).

Koempferiœ Galanga, L. (*Scitamineæ*) Kunchur, the juice of the rhizome is given for an expectorant and carminative in coughs in doses of one teaspoonful (Holmes). It is often sold in the shops, but is rather expensive. It has a reputation as a stomachic.

ALERATIVES AND TONICS.

Acanthus ebracteatus, Vahl. and *A. ilicifolius* (*Acanthaceœ*) "Jeruju." Common tidal mud plants with prickly holly like leaves and white or blue flowers. The seeds powdered are administered in water in cases of outbreaks of boils. The natives say that as many seeds as the patient takes for so many years he will be free from the recurrence of the boils, the drug has been apparently successful in some European cases and is worth paying attention to. HOLMES says 2 or 3 seeds administered to children as an anthelmintic.

Trevesia palmata, Vis. (*Araliaceæ*) "Daun Buka Nafsu" A decoction of the leaves and root bark is used as a tonic (Holmes) The species here is *T. sundaica* Miq. I can make nothing of the native name given by HOLMES"

Sesbania grandiflora, Pers. (*Leguminosæ*) The bark is used as a tonic in doses of 10 to 20 grains (Holmes).

Evodia triphylla, Dec. (probably *E. roxburghiana* is meant) (*Rutaceæ*). A common tree "Tengah Burong" An infusion of the leaves and flowers as a tonic and emmenagogue (Holmes).

ANTHELMINTICS.

I cannot find very many of these in use, but the following are used.

Combretum trifoliatum, Vent. "Akar Song-song harus" (*Combretaceæ*). A long climber with green flowers and curious four angled fruits, which are used for *Ascaris*. The fruits are usually imported from India and sold in the druggist's shops. The plant is however wild also in Malacca.

Bonnaya verbenæfolia Benth. (*Scrophularineæ*) "Poko Sumpuk Chaching" A decoction of the whole plant is used. It is a small prostrate weed.

Hedychium longicornutum, Bark. (*Zingiberaceæ*) "Ubat Chaching" An epiphytic ginger, the roots (which certainly resemble worms) are used for an anthelmintic and also in cases of Syphilis.

Solanum sarmentosum (*Solanaceæ*) The seeds have a reputation as a vermifuge.

Punica granatum, L. Pomegranate. The bark of the roots is used here as elsewhere for Taenia.

Areca Catechu, L. (*Palmæ*) Pinang, Betelnut, also a well known vermifuge occasionally used for as caris. A good worm medicine for dogs.

Leucas linifoliæ, Spr. (*Labiatæ*) Ketumbak, Ketumbit. A decoction of the leaves is given for round worms (Holmes). The leaves of the closely allied *L. Zeylanica* are used for itch. These plants are common weeds with white flowers.

Morinda umbellata, L. (*Rubiaceæ*) "Mengkudu Hutan" A decoction of the leaves and root used for a vermifuge for children (Holmes).

"*Eugenia buxifolia*, Hook. Nasi-nasi (*Myrtaceæ*) The leaves and root of this shrub are given in the form of decoction as vermifuge" (Holmes) *E. buxifolia* does not occur here, probably *E. Zeylanica* commonly known as Nasi-nasi from its white fruits is meant.

Quisqualis indica (*Combretaceœ*) "Ordanie" The seeds are given to the extent of four or five bruised in syrup as a vermifuge as in India (Holmes).

Carica Papaya, L. Papaw. "The fresh milky juice is given in doses of one half ounce as a vermifuge (Holmes). This latex may also be used in dyspepsia, and the prepared drug, Papaine, is in considerable demand in England both for dyspepsia and curing ulcers. Excellent samples of dry Papain were shown from Kamuning Estate by Mr. MACHADO at the Penang Show. The seeds are considered in India to be a powerful emmenagogue, and it is known that their use tends to produce abortion.

Coix Lachryma Jobi (*Gramineæ*) Job's tears "Menjilai Batu" Roots boiled and decoction given to drink for worms in children.

Elephantopus scaber, L. (*Compositæ*) "Tutup Bumi," is said by HOLMES to be used as an anthelmintic for round worms.

Embelia Ribes (*Myrsineæ*) The fruits of this climber are anthelmintic and it is suggested in the Indian Pharmacopoeia to substitute them for Malefern.

Among external applications. *Pilea muscosa* (*Urticaceœ*) the Artillery plant, a little weed common in gardens is rubbed up with garlic and salt and applied to the stomach of a child to expel ascarides, and *Hyptis brevipes* Poit. A common weed in damp ground is also used to poultice the belly for the same purpose.

Report of the Department of Agriculture in the Federated Malay States for 1905.

The first report on this Department is issued by the Director, Mr. J. B. CARRUTHERS. As he however, only arrived in June, it is natural that the main work consisted of organising and generally looking into the conditions of Agriculture there as they are at present, in the Native States. As mentioned in the earlier number of the Bulletin, Mr. CARRUTHERS occupied himself with investigations as to the action of fumes from tin furnaces on various trees. These however, are not yet completed. The eradication of Lalang by means of spraying with copper sulphate and arsenious acid was experimented on, and found to be cheaper than digging or ploughing. Further experiments are to be tried on a larger scale. Arsenious acid will of course kill weeds but will it not leave the ground spoilt for any cultivation?

The notes on Rubber cultivation contain some facts of interest "The acreage alienated for the planting of *Hevea braziliensis* and *Ficus elastica* is now about 100,000 acres practically all Para.

Of this 38,000 acres is already planted, the figures being:—

Under 1 year old	16,000
One year old	6,000
Two „	4,500
Three „	3,000
Four „	2,500
Five „ and over	6,000

Most of the Para plantations over five years' old are planted 200 to the acre, some Estates having more than 300, but on the more recent clearings the distance apart is greater and the average about 175 to the acre.

The number of Rubber trees of all ages in the Federated Malay States is approximately between 6 and 7 million.

Last year's production of Rubber was estimated at 300,000 lbs. The total world's consumption as found in the official statistics of net imports of the great rubber consuming countries—United States, Germany, Great Britain, France, Belgium, Austria and Italy, was 137,530,458 lbs. or 61,397 tons. These official figures fall short of the world's consumption probably as much as 15-20 per cent., but taking them as approximate the Federated Malay States in 1905 produced $\frac{1}{200}$th of the world's consumption. But the world's consumption as shown by official statistics is:—

1903	112,860,478 lbs.	50,384 tons.
1904	123,817,903 „	55,275 „
1905	137,530,458 „	61,397 „

an increase roughly of 10 per cent. each year. So that in 1912 we may expect an increased consumption of 70 per cent. more than in 1905.

A demand for 232,288,000 lbs. or 103,700 tons, and of that we could supply only $\frac{1}{58}$th part.

These statistics show that even if the increased demand of 10 per cent. per annum does not continue, there is little fear of overproduction for many years to come. Although rubber Estates on large scales are being formed in many other places besides the Malay States.

Coconuts show an acreage nearly three times as great as that of rubber and has increased by 10,000 acres, during the year still calculating the value placed on rubber land, the capital value of the rubber Estates is higher than that of coconuts.

H. N. R.

A NEW WAY OF DEALING WITH TERMES GESTROI.

Some five years ago a Chinaman who had purchased the hill of Bukit Duyong in Malacca as a grave-yard, reflected that it would be better to convert it into a rubber plantation. The hill was of the most unpromising character, dry, gravelly and rocky soil, on which little would grow. He planted it up with Para rubber and *Willughbeia firma.* The latter though it forms now good sized bushes is useless as it has generally proved from the stems being too slender. The Para rubber though by no means as good as in first class soil, has attained a fair size and I was informed, gave the owner an average of 2 lbs. of rubber per tree. This he makes into thin sheets partly cutting them into strips that they may dry better. He is said to make $2,000 a year from the 25 acres he possesses. A few of the trees are attacked by *Termes Gestroi*, and he set a bricklayer in his employment to clean the tree every day. The man wearied of the work and taking some cement filled up the holes in the tree which the termites had excavated. The insects disappeared altogether, and the tree seems none the worse for the treatment but is still growing steadily.

H. N. R.

CORTICIUM JAVANICUM

On Para Rubber.

In "Teysmannia" 5, 19, is an article by Dr. Ch. Bernard on *Corticium javanicum* attacking young *Hevea braziliensis* in Deli. The stem was covered with a greyish rose coloured fungus. This pest has also been seen on *Bixa orellana*, *Boehmeria nivea.* Probably the *Corticium* so common in the Straits on Ramie and *Strobilanthes* when overcrowded and too damp is this species. We have not yet seen it on rubber seedlings in the Straits, but it is quite likely to occur in overcrowded and overshaded nurseries. By removing the infected plants, letting more light and air among the others, and spraying with Bordeaux mixture there ought to be no difficulty in keeping down the pest.

The paper referred to above is, unfortunately, published in Dutch so as to be incomprehensible to many.

H. N. R.

PERSONAL AND OTHER NOTES.

Mr. D. Tait, formerly employed in the Botanic Gardens, Edinburgh, lately passed through Singapore on his way to Christmas Island where he will be employed in the Agriculture and Horticulture of the Island.

Mr. E. W. Eaton, Agricultural Chemist, has arrived in the Federated Malay States to take up researches into various chemical problems.

A new edition of Mr. H. Wright's book on Para rubber has just been published. It is much enlarged and contains more illustrations than the previous edition and is altogether much improved and more up to date.

GOW, WILSON & STANTON, LIMITED.
India Rubber Market Report.

13, Rood Lane, London, E. C.
May 25*th*, 1906.

At to day's auction, 159 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer. The total weight amounted to nearly 10 tons, Ceylon contributing nearly one and Straits Settlements 8½.

Since the last auction the market has maintained the quiet tone then prevailing, and except for fine biscuit and sheet qualities, demand was not very keen, and consequently the scrap grades were in many cases somewhat neglected, and here and there showed a decline on last rates.

The bulk of the offerings was from the Straits and included one or two large invoices. Amongst these were several parcels of crape, and the darker lots prove difficult to quit, buyers being prejudiced against the darker colours. For fine pale crape, however, there is a strong demand, and a parcel of this to-day realized ½*d.* per lb. more than fine sheet. A small lot of very fine pressed worm rubber was also keenly competed for and sold at 6/2¼ per lb.

QUOTATIONS.—Fine sheet, 6/1.

Crape
- Fine pale, 6/1½.
- Darker, 5/3 to 5/6¾.
- Dark 5/-.

Fine pale pressed worm, 6/2¼.
Fine biscuits, 6/1 to 6/1½.
Scrappy sheet, 4/7½ to 4/10.

Scrap
- Fine, 5/3.
- Medium, 4/- to 4/8½,
- Low, 3/-.

PLANTATION BISCUITS AND SHEET TO-DAY.—6/1 to 6/1½, same period last year, 6/5 to 6/9¾.

PLANTATION SCRAP.—4/- to 5/3, same period last year, 4/6 to 5/5.

FINE HARD PARA (South American).—5/3¼, same period last year, 5/8½.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

106 packages at 5/9½ per lb., against 212 packages at 5/9¼ per lb. at last auction.

Particulars and prices as follows :—

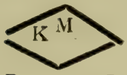
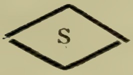
Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Gikiyanikande	2 cases fine palish rolled crape, 5 6¼. 1 case darkish, bought in. 1 case dark, bought in.

Mark.	Quantity, Description and Price per lb.
Ambatenne S A	2 cases good dark cloudy biscuits, 6/1. 1 bag rougher, 6/1.
M M	1 case small palish Ceara biscuits, 6/1. 1 bag rejected biscuits and scrap, bought in. 1 box fine pale Ceara biscuits, bought in.
Rangbodde	1 case exceptionally fine very pale biscuits, 6/1½.
F J W	2 cases fine pale pressed worm, 6/2¼.
OBEC	4 cases fine amber sheet, 6/1. 1 case scrappy sheet, 5/-.
Kondegalla New Rasagalla	1 case fine large palish to dark biscuits, 6/1. 1 case good darkish scrap and cuttings, bought in.
Hapugastenne	2 cases good palish to dark biscuits, 6/1. 1 case good pale to darkish scrap, 5/2½,
D	1 case small palish biscuits, heated 5/6. 1 bag small lumps, 4/-.

STRAITS SETTLEMENTS.

Mark.	Quantity, Description and Price per lb.
T E B C 2	4 cases palish to dark crape, bought in.
Pataling	7 cases thick darkish crape, bought in. 1 case thick soft crape, bought in.
P S P R	8 cases fine pale crape, bought in. 1 case palish, bought in.
P R H	2 cases scrappy sheet, 5/1. 1 bag pale scrappy sheet, 5/0½. 1 case palish scrap, 4/-.
M I	2 cases fine large palish to dark biscuits, 6/1. 1 case fine pale scrap, 5/3¼.
B L C L E	1 case rough palish to dark crape, 5/-.
Muar Straits	8 cases fine pale crape, 6/1½. 1 case good darkish crape, 5/3. 1 case dark, 5/-.
PSE	2 cases good amber sheet, 6/1.
T O P C R	1 case good rough sheet, 6/1.
R W and Co. E	12 cases fine amber sheet, 6/1. 2 cases good darkish scrap, 4/8½. 1 case dark scrap and pieces, 5/-.
V R Co Ld Klang F M S	21 cases fine washed scored sheet, 6/1. 5 cases fine palish pressed crape, bought in. 6 cases darker, bought in.
GULA	1 case good rough sheet, 6/1. 1 case pressed scrappy sheet, 5/2¼
S R C	15 cases fine washed scored sheet, bought in. 9 cases good palish to darkish crape, 5/6¾ 1 case dark pressed crape, bought in.

Mark.	Quantity, Description and Price per lb.
P R S B	6 cases fine large amber sheet, 6/1. 2 cases darkish scrap, 4/8. 1 case pressed scrappy sheet, 4/7½.
G M S B	4 cases scrappy sheet and scrap, 4/10. 1 case fine amber sheet, 6/1. 1 case fine palish scrap, 5/3.
 K M P R	1 case rough sheet, part uncured, 5/4.
 S S R	1 case low scrap, 3/-.

SHIPMENTS OF PLANTATION RUBBER.

Total Exports from Colombo and Galle from 1st January to 23rd April.

1906	35½ tons.
1905	13¾ ,,
1904	10¾ ,,
1903	5½ ,,

Total Exports from Singapore from 1st January to 6th April, 1906, 48½ tons.

GOW, WILSON & STANTON, LIMITED.
India Rubber Market Report.

13, Rood Lane, London, E. C.
June 8th, 1906.

At to-day's auction, 184 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which 123 were sold. The total weight amounted to about 8 tons, Ceylon contributing 3½ and Straits Settlements 4½.

The quiet tone ruling before the holidays was again in evidence. Demand, as at last auction, ran chiefly on the finer kinds, and one or two parcels showing particularly fine quality were well competed for up to 6/1½ per lb., a price which was paid for some Ceylon biscuits from the Ingoya Estate. The figure generally paid for fine biscuits was 6/0¼, being a decline of about ¾*d.* per lb. on last rates.

There were some parcels of Crape of the darker qualities offering, the darkish of which were again rather neglected. For Fine Scrap competition was good, but the lower kinds lacked attention.

Quotations.—Fine sheet, 6/- to 6/0¾.
Fine biscuits, 6/- to 6/1½.
Crape { Fine pale, none offering.
Darker, 5/5½ to 5/9½.
Dark, 4/9 to 4/11.
Rejections, 4/9½ to 5/-.

Scrap { Fine, 5/1 to 5/2.
Medium, 4/6 to 4/6½.
Low, 3/6.
Fine Red Rambong, 4/10½.

PLANTATION BISCUITS AND SHEET TO-DAY.—6/- to 6/1½, same period last year, 6/5 to 6/9.

PLANTATION SCRAP.—4/6 to 5/2, same period last year, 4/6 to 5/7¼.

FINE HARD PARA (South American).—5/3, same period last year, 5/8½.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

123 packages at 5/8 per lb., against 106 packages at 5/9½ per lb. at last auction.

Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Langsland	4 cases fine amber biscuits, 6/0¼. 1 case darker, 6/0¼.
Culloden	8 cases fine darkish pressed scrap, bought in. 2 cases dark, bought in.
Arapolakande	3 cases fine darkish and dark biscuits, 6/0¼. 3 cases black, 6/0¼, 2 cases darkish scrap, 5/1.
Ingoya	2 cases very fine palish amber biscuits, 6/1¼. 3 cases slightly darker, 6/1½. 2 cases fine palish pressed scrap, 5/1.
Galatura	1 case darkish dull biscuits, 6/0¼.
Halwatura	1 case palish to darkish scrap, etc., 5/1¼.
S A M M	1 bag rejected biscuits and pieces, bought in.
H L K	2 cases small cloudy Ceara biscuits, 6/-. 1 case darker, 6/-. 1 bag rejections, bought in.
D C	13 cases pale to dark biscuits (part Ceara), 6/0¼. 1 case darkish biscuits, 5/11. 1 case scrap, 5/-. 1 case heated scrap, part loaded. 3/6. 1 case rejections, 5/-. 1 case scrappy rejections, 4/9½.
D I	1 case darkish crape, bought in.
L	10 cases darkish crape, bought in.
	STRAITS SETTLEMENTS.
S	5 cases fine amber sheet, 6/0¼. 1 case darkish pressed scrap, 4/6½. 2 cases dark, bought in.
R R PSE	5 cases fine amber sheet, 6/0¼.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Jebong	13 cases fine amber sheet, bought in. 1 case heated sheet scrap, bought in. 1 case better, bought in. 4 cases good darkish scrap, 5/2. 1 case rough scrappy sheet, bought in.
D W H S	3 cases palish to darkish crape, thick, 5/5½ to 5/9½. 5 cases dark, 4/9 to 4/11.
B R R Co., Ld.	17 cases fine palish to darkish amber sheet, 6/0½ to 6/0¾. 8 cases same, 6/0¼. 8 cases palish to darkish mottled sheet, 6/-. 5 cases darkish pressed scrap, 5/1. 8 cases dark scrap, 4/6. 6 cases thick Rambong sheet, bought in. 3 cases pressed Rambong scrap (red), 4/10½.
W P M T C	6 cases fine amber sheet, 6/0¼. 1 case fine palish scrap, bought in. 1 case good darkish scrap, bought in. 1 case rejected sheet, bought in. 1 bag Rambong scrap, bought in.
S R Mergui	6 cases small oblong biscuits, bought in. 4 cases good ball scrap, bought in. 2 cases rejections, bought in.

SHIPMENTS OF PLANTATION RUBBER.

Exports from Colombo and Galle from 1st January to 14th May.

1906	42½ tons.
1905	16½ ,,
1904	12½ ,,
1903	7 ,,

Exports from Singapore 1st four months of 1906, 61½ tons.
Do. Do. Do. 1905, 5 ,,

Singapore.

Abstract of Meteorological Readings for the month of June, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	Ins.	°F	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory	29·893	134·2	80·5	87·3	75·0	12·3	77·7	·892	75·7	83	S. E. S.S.E.	12·95	2·45

A. B. LEICESTER,
Meteorological Observer.

T. C. MUGLISTON,
Acting Principal Civil Medical Officer, S. S.

Kandang Kerbau Hospital Observatory,
SINGAPORE, 14*th July*, 1906.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of June, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29·908	143·4	80·8	89·1	74·9	14·2	77·6	·880	75·43	79·0	S.	8·07	2·21

PRISON OBSERVATORY,
PENANG, *9th July*, 1906.

M. E. SCRIVEN,
Assistant Surgeon.

S. LUCY,
Colonial Surgeon, Penang.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of June, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	...	147	83·53	96	72	24	77·96	886	...	77	...	6·24	1·31
Kuala Kangsar	...	...	81·52	93	71	22	76·75	858	...	79	...	4·11	1·43
Batu Gajah	...	157	81·25	93	72	21	77·33	886	...	84	...	3·66	·83
Gopeng	...	...	81·19	92	68	24	76·26	840	...	79	...	3·00	·65
Ipoh		...	81·98	92	73	19	78·19	915	...	84	...	4·66	1·50
Kampar	...	...	...	93	71	22	...	...	...	...	..	6·79	1·65
Teluk Anson	...	...	81·28	93	68	25	77·49	894	...	84	...	7·83	3·37
Tapah	...	...	81·19	94	69	25	76·96	873	...	83	...	6·87	2·75
Parit Buntar	...	...	82·98	93	72	21	76·99	848	...	75	...	3·54	·90
Bagan Serai	...	...	82·69	94	70	24	77·64	881	...	79	...	4·22	·85
Selama	...	...	81·94	93	73	20	77·50	885	...	82	...	10·24	2·77

STATE SURGEON'S OFFICE,
TAIPING, *9th July*, 1906.

S. C. G. FOX,
Acting State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of June, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·883	146·7	80·8	89·8	71·4	18·4	76·5	0·829	73·3	78	Calm	5·66	1·35
Pudoh Gaol Hospital ,,	...	...	...	...	...	...	...	...	...	...	...	4·70	1·41
District Hospital ,,	...	...	...	...	...	...	...	...	...	...	...	6·70	1·66
,, Klang	...	...	...	88·1	69·8	81·2	...	...	...	...	...	5·51	1·28
,, Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	6·53	2·05
,, Kajang	...	...	...	90·0	71·9	18·1	...	...	...	...	...	6·35	1·18
,, Kuala Selangor	...	...	...	...	...	...	...	...	...	...	...	3·01	1·09
,, Kuala Kubu	...	...	...	...	...	...	...	...	...	...	...	10·77	1·51
,, Serendah	...	...	...	...	...	...	...	...	...	...	...	4·16	0·91
,, Rawang	...	...	...	...	...	...	...	...	...	...	...	5·11	1·38
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	5·40	2·48
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	..	1·06	0·94

STATE SURGEON'S OFFICE,
KUALA LUMPUR, 16th *July*, 1906.

E. A. O. TRAVERS,
State Surgeon, Selangor.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of May, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	95·0	70·0	19·67	...	...	...	...	...	3·73	·88
Raub ...	...	...	...	94·0	70·0	17·72	...	...	...	...	...	3·20	1·62
Bentong ...	...	...	...	93·0	70·0	18·32	...	...	...	...	...	9·75	2·15
Temerloh ...	...	...	...	95·0	71·0	18·51	...	...	...	...	...	1·65	·45
Pekan ...	...	...	...	90·0	72·0	13·87	...	...	...	...	...	4·79	1·42
Kuantan ...	...	...	...	75·0	70·0	18·51	...	...	...	...	...	1·20	·37

STATE SURGEON'S OFFICE,

RAUB, *6th July*, 1906.

W. H. FRY,

State Surgeon, Pahang.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of June, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	94·0	68·0	20·27	...	...	...	...	...	4·54	1·80
Raub ...	...	...	...	94·5	68·0	17·30	...	...	...	...	...	5·61	2·31
Bentong ...	...	...	...	93·0	67·0	19·33	...	...	...	...	...	6·71	1·95
Temerloh ...	...	...	...	94·0	70·0	17·73	...	..	...	...	...	3·80	1·31
Pekan ..	...	...	...	89·0	71·0	13·30	...	...	...	...	...	6·30	1·61
Kuantan ...	...	...	...	94·0	70·0	15·40	...	...	...	...	...	3·49	·86

RAUB,

16th July, 1906.

W. H. FRY,

State Surgeon, Pahang.

The Duff Development Company, Limited, Kelantan.

Abstract of Meteorological Readings for the month of June 1906.

DISTRICT.	Temperature.			Total Rainfall.	Greatest Rainfall during 24 hours.
	Maximum.	Minimum.	Range.		
	Mean. °F	Mean. °F	Mean. °F	Inches.	Inches.
Kuala Lebir ..	86·6	71·5	15·7	3·01	·63
Ulu Liang ...	85·7	72·1	13·6	6·04	1·36
Serasa ...	91·0	71·0	20·0	4·48	2·08
Kuala Kelantan ...	86·40	74·06	12·33	4·82	1·78

SURGEON'S OFFICE,
KUALA LEBIR, 10*th July*, 1906.

TRISTON BAKER, M.D.
Surgeon.

METEOROLOGICAL OBSERVATIONS.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the Month of May, 1906.

Date.	Temperature of Radiation.										Wind. Direction.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Clouds and weather Initials.			Rain.
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference sun and shade.	Grass.	Difference shade and radiation.	9 H	15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	21 H	9 H	15 H	21 H	Inches.
	°	°	°	°	°	°	°	°	°	°			°	°	°	in.	in.	in.	°	°	°							
1	79	84	81	85	73	12	125	40	...	...	S.E.	S.E.	75·6	75·7	75·6	0·888	0·888	0·888	90	76	83	3	3	5	C	C	C	1·19
2	81	82	81·5	83	74	9	146	63	...	...	S.E.	S.E.	76·	75·3	75·6	·897	·877	·887	85	80	82·5	0	3	5	B	C	C	·60
3	80	88	84	88	72	16	145	57	...	...	E.	S.E.	75·	76·5	75·7	·867	·913	·890	85	69	77	0	0	3	B	B	C	·20
4	79	86	82·5	87	74	13	140	53	...	...	S.E.	S.	73·9	74·	73·9	·839	·855	·847	85	68	76·5	0	0	0	B	B	B	
5	79	86	82·5	87	74	13	147	60	...	...	S.E.	N.E.	73·9	76·	74·9	·839	·904	·871	85	72	78·5	0	0	0	B	B	B	1·00
6	79	85	82	86	74	12	144	58	...	...	E.	E.	75·6	80·	77·8	·888	1·026	·952	90	85	87·5	0	3	5	B	C	C	·40
7	82	86	84	86	73	13	147	61	...	...	E.	E.	77·	76·	76·5	·926	0·904	·915	85	72	78·5	0	0	0	B	B	B	
8	79	84	81·5	85	75	10	141	56	...	...	E.	E.	77·3	77·4	77·3	·937	·938	·937	95	80	87·5	0	3	5	B	C	C	·98
9	80	86	83	86	74	12	144	58	...	...	E.	E.	75·	76·	75·5	·867	·904	·885	85	72	78·5	3	0	5	C	B	C	4·36
10	76	81	78·5	82	73	9	118	36	...	...	E.	E.	74·3	76·	75·1	·848	·897	·872	94	85	89·5	10	5	3	R	C	C	·08
11	78	86	82	87	73	14	144	57	...	...	S.E.	E.	76·3	76·	76·1	·906	·904	·905	94	72	83	0	0	3	B	B	C	·72
12	76	85	80·5	85	73	12	138	53	...	...	E.	E.	74·3	76·7	75·5	·848	·922	·885	94	76	85	10	5	5	R	C	C	
13	80	82	81	87	73	14	140	53	...	...	E.	S.E.	76·6	78·7	77·6	·916	·978	·947	90	90	90	0	0	0	B	B	B	
14	80	85	82·5	86	74	12	139	53	...	...	S.E.	S.E.	75·	76·7	75·8	·867	·922	·894	85	76	80·5	2	0	0	B	B	B	·12
15	81	83	82	84	74	10	145	61	...	...	S.E.	S.E.	76·	76·3	76·1	·897	·905	·901	85	80	82·5	0	0	0	B	B	B	
16	80	82	81	82	73	9	140	58	...	...	S.E.	S.E.	76·6	77·	76·8	·916	·926	·921	90	85	87·5	0	3	5	B	C	C	
17	81	90	85·5	90	74	16	145	55	...	...	S.E.	S.E.	77·	77·	77·	·947	·930	·938	90	65	77·5	0	0	0	B	B	B	·10
18	82	88	85	88	73	15	147	59	...	...	S.E.	S.E.	77·	76·5	76·7	·926	·913	·919	85	69	77	0	0	0	B	B	B	·05
19	82	84	83	85	73	12	138	53	...	...	S.E.	S.E.	75·3	75·7	75·5	·877	·888	·882	80	76	78	3	0	0	C	B	B	
20	81	88	84·5	89	74	15	137	48	...	...	S.E.	S.	77·	73·3	75·1	·947	·819	·883	90	61	75·5	3	0	3	C	B	C	1·72
21	75	82	78·5	82	74	8	108	26	...	...	E,	S.E.	73·3	77·	75·1	·820	·926	·873	94	85	89·5	10	3	0	R	C	B	
22	78	85	81·5	85	73	12	127	42	...	...	E,	S.E.	76·3	75·	75·6	·906	·873	·889	94	72	83	3	5	0	C	C	B	
23	79	83	81	84	74	10	136	52	...	...	S.E.	E.	75·6	76·3	75·9	·888	·905	·896	90	80	85	3	2	3	C	B	C	·36
24	76	86	81	86	72	14	132	46	...	...	E.	S.E	74·3	76·	75·1	·848	·904	·876	94	72	83	5	3	5	C	C	C	
25	75	85	80	85	74	11	130	45	...	...	E.	S.W.	73·3	75·	74·1	·820	·873	·846	94	72	83	10	3	2	R	C	B	·14
26	81	83	82	84	74	10	140	56	...	...	S.E.	S.	77·	76·3	76·6	·947	·905	·926	90	80	85	5	3	5	C	C	C	·44
27	78	88	83	88	75	13	143	55	...	...	S.E.	S.W.	76·3	76·5	76·4	·906	·913	·909	94	69	81·5	2	0	3	B	B	C	·25
28	76	86	81	87	71	16	145	58	...	...	S.E.	S.E.	74·3	76·	75·1	·848	·904	·876	94	72	83	3	0	3	C	B	C	
29	75	82	78·5	84	72	12	132	48	...	...	S E.	S.E.	69·8	77·	73·4	·731	·926	.828	84	85	84·5	10	3	2	R	C	B	·54
30	80	85	82·5	86	73	13	140	54	...	...	S.E.	S.E.	75·	75·	75·	·867	·873	·870	85	72	78·5	2	0	0	B	B	B	
31	80	86	83	88	72	16	145	57	...	...	S.E.	S E.	75·	72·8	73·9	·867	·808	·837	85	64	74·5	0	0	0	B	B	B	·12

Total 13·37

State Surgeon's Office,
Seremban, 12*th June*, 1906.

R. VAN GEYZEL,
Apothecary.

No. 7.] JULY, 1906. [Vol. V.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

EDITED BY

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NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, &c. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valua-"tion regarding new or little known natural or manufactured pro-"ducts of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M.A., F.R.S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given.

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 7.] JULY, 1906. [Vol. V.

TAPIOCA AS A CATCH-CROP

By Mr. W. Dunman.

The desirability of this culture is one of far greater importance than would appear to be the case until the subject has been carefully studied.

There is at the moment in the Peninsula a far larger area under Tapioca than Para Rubber. Hitherto such areas have been allowed to become huge wastes of lalang. It requires no argument to prove that such wilful waste of enormous areas of good agricultural land, means a loss of revenue to the country.

There are two reasonable ways of dealing with the matter.

1. The use of chemical manure as is done in Java.
2. A change of crop.

The latter seems the easier method and naturally one looks to Para Rubber, more particularly at the present moment.

One important thing is to get a large area of Para planted up at once.

There are at the moment several large Tapioca estates in Malacca and various other parts of the Peninsula which could be acquired at reasonable rates—going concerns with Tapioca plant and plenty of labour. On such properties 1,000 acres of Para could be planted up yearly without any difficulty, at a cost of $15 per acre (allowing 5 cents for stumps)—150 per acre. There is nothing to pay for weeding during the first 3 years.

If two crops of Tapioca have already been taken out of the ground possibly $20 per acre should be spent in manure, but considering the Chinese are willing to work the Tapioca, paying a royalty of 20 to 30 % according to the market price, such an expenditure could well be afforded.

The Chinese in Malacca are now planting Para largely with their Tapioca, but they do not consider the Para sufficiently as the holing is poorly done and very small plants are put in and in spite of this, one sees rubber of good growth. On the other hand, where this is being done by Europeans, according to recognized methods, the new fields being holed and planted with stumps simultaneously with the Tapioca, the growth of the Para is much the same as would be the case without a catch crop, with the advantage of no expense of felling, roading and weeding, and at the same time getting a quarter of the value of the Tapioca.

A visit to the Diamond Jubilee Estate in Malacca, will shew what is being done by the Asiatic Rubber Company under Mr. MOORHOUSE'S superintendence.

One thing is certain—within two years of starting this estate will have in some 3,000 acres of Rubber, the cost of which will be about covered by their returns from the Tapioca!

The following particulars represent a typical property in Malacca and were got together with a view of taking over a Tapioca Estate and planting Para. The estimates are very full, still the figures and other matter give a fair idea of what can be done.

W. DUNMAN.

SINGAPORE, 23*rd July*, 1906.

THE RIM RUBBER COMPANY.

The following extracts from the prospectus of this Company gives a good idea of the methods of working and the estimated cost and return of a tapioca and rubber estate combined.

The estate is situated at the 21st mile on the Jasin road, Malacca, and near the Diamond Jubilee Estate. The property consists of 4,153 acres of land held under Government Grants for 999 years at a total rental of $3,517.60 per annum.

There is under cultivation.

Tapioca 1st crop	937 acres.
,, 2nd ,,	424 ,,
,, 3rd ,,	400 ,,
Para Rubber 300 acres planted 15′ × 15′ in the 3rd crop.	
Do. 300 acres planted 16½′ × 16½′ in the 2nd crop.	
Rambong 1,000 trees ready to tap	133 acres
Do. 500 ,, younger	
Coconut 1,000 ,, in bearing	
Do. 3,000 ,, 2 years old	
round bungalow and factory	
Virgin forest now being felled ...	293 ,,
Do. reserve	395 ,,
Lalang and Belukar	1,571 ,,
	4,153 acres.

The Tapioca Factory.—is completely equipped and is now turning out 800 piculs of Tapioca per month.

Thirty-five coolie sheds to hold 500 men 2 Bungalows in good order, but requiring kitchens and out-houses.

The working of the Tapioca is leased to the present owners for a period of 5 years under the agreement the lessees have to keep up all existing clearings to the end of the second crop when they must be handed over free of lalang and weeds. The lessee has to open up and up-keep at least 400 acres of new forest every year and maintain same for a period of not less than 3½ years (end of second crop). The Para Rubber in such clearings to be planted at purchaser's expense.

The lessees have to pay a royalty according to the fluctuations of the price of Tapioca.

$10.00	per picul.	30%	$7.80	per picul.	24%
9.60	,,	29 ,,	7.60	,,	23 ,,
9.20	,,	28 ,,	7.40	,,	22 ,,
8.80	,,	27 ,,	7.20	,,	21 ,,
8.40	,,	26 ,,	7.00	,,	20 ,,
8.00	,,	25 ,,	and so on.		

The agreement is terminable at 6 months' notice from either side.

The purchasers must have their own manager and a staff of coolies to plant and look after the rubber, etc.

By the end of 1906 there should be 1,500 acres,
,, 1907 ,, 2,500 ,,
of Para Rubber planted of which 700 acres will be in virgin jungle.

Estimates of 1906.

	$	$
Planting up 900 acres with Para 16½′ × 16½′ with stumps	18.000	
Nurseries and Seed 300,000	2,000	
Management (6 months)	2,500	
Additions to Bungalow and furniture ...	1,000	
Tools and contingencies	750	
Rent 6 months	1,750	
		26,000
Income.		
Royalty on Tapioca 6 months 800 pls. per month @ 25%	9,600	
Proceeds of Rambong and Coconuts ...	1,400	11,000
		15,000

1907.

	$	
Planting up 1,000 acres with Para @ $10 per acre (from nurseries)	10,000	
Management and Allowances	5,000	
Rent	3,500	
Roads and Drains	1,000	
Contingencies	500	20,000

Income.

	$	
Royalty on Tapioca 1,200 pls. per month @ $7.00 = 20%	20,000	
Proceeds of Rambong and Coconuts	2,000	22,000
	Profit ...	$2,000

1908.

	$	$
Management and Allowances	5,000	
Rent	3,500	
Roads and Drains	1,500	
Weeding 250 acres (to be handed over clean)	2,000	
General improvements and Contingencies	2,000	14,000

Income.

Same as 1907		22,000
	Profit ...	8,000

1909.

	$	$
Management and Allowances	8,500	
Rent	3,500	
Roads and Drains	1,500	
Weeding, say 1,600 acres @ 75 cents	14,500	
General improvements and Contingencies	2,000	30,000

Income.

Same as 1907		22,000
	Loss ...	8,000

1910.

	$	$
Management and Allowances	8,500	
Rent	3,500	
Roads and Drains	1,000	
Weeding 2,000 acres @ 50 cents (Considerable shade from Rubber)	12,000	
Contingencies	1,000	26,000
	Carried forward ...	$26,000

	$
Brought forward	26,000
Income, say	12,000
Loss ...	14,000

Consequently at the end of 1910 the position should be
1,500 acres of Para 4 years old.
1,000 do. 3 to 3½ years old.

Costing, say $25,000 or $100 per acre or half what planting under ordinary circumstances would amount to while the most that could be efficiently planted in virgin jungle would be 300 acres per annum.

Granting the growth with a catch crop to be somewhat slower still it leaves the position greatly in favour of that system, and much more so if the comparison be made up to the year 1913, when the Rubber Estate with Tapioca would have 2,500 acres being tapped against 600 acres or at most 900 acres in the other case.

Abstract of estimated Expenditure and Receipts.

1906	$26,000	$11,000
1907	20,000	22,000
1908	14,000	22,000
1909	30,000	22,000
1910	26,000	12,000
	$116,000	$89,000

Balance of Expenditure over Receipts, $27,000 against $40,000 allowed in estimates for working expenses.

The Diamond Jubilee Estate adjoining are working with great success on similar lines. They have planted since October last over 1,500 acres of Para Rubber which fully proves the exceptional labour conditions.

If the Rubber is planted in virgin jungle at the same time as the Tapioca, I am firmly of the opinion that the stoppage of growth will be very slight.

That Para can be efficiently cultivated even after two crops of Tapioca have been taken, is certain, because I have seen young fields planted under such conditions doing well, and there are on the Diamond Jubilee Estate, one year old trees of one year old of most satisfactory growth in ground where 4 and 5 crops of Tapioca have been taken.

The Rambong is looking as healthy as any I have seen elsewhere.

The advantages of planting in Tapioca are:—

1st.—A far larger area can be planted up in less time than could be possible elsewhere.

2nd.—Unlimited Chinese labour at reasonable rates and no advances.

3rd.—Reduced expenses during the first three years.

4th.—A handsome income from the Tapioca, judging from Messrs. BAILEY and BURGESS' reports on Bukit Asahan, I make the soil on Rim to be far better. There is little or no laterite on which account Mr. BAILEY denounces Bukit Asahan.

It is noteworthy that HERBERT WRIGHT in his book "*Hevea Braziliensis,*" now considered the most up to date authority, quotes Tapioca as one of the most useful of catch crops.

Had the Chinese considered the Rubber equally with the Tapioca, there would have been some magnificent estates in Malacca, but putting in small seedlings and not holing carefully has retarded the growth during the first year much more than the fact that there is a catch crop of Tapioca. It is essentially in the first year that Para requires attention and care.

W. DUNMAN.

SYDN. MOORHOUSE values the Tapioca crop in ground	@ $186,000=	$186,000
Buildings and plant	50,000	50,000
Land—2,500 acres @ $40		100,000
Lalang and Belukar land, 1,500 acres @ $10		15,000
Rubber planted, 600 acres @ $50		30,000
		$380,000

SYDN. MOORHOUSE,
Manager, Diamond Jubilee Estate.

18th June, 1906.

NOTES FROM THE REPORT OF THE RESIDENT-GENERAL OF THE FED: MALAY STATES.

Rubber.—The high price of rubber and the proved suitability of land in the States for its cultivation have led to numerous applications for land in all four states but more particularly in Selangor where almost all the accessible land between the Klang and Selangor rivers has been taken up for rubber planting next to the Coast districts of Selangor the Sungei Ujong districts of Negri Sembilan appears to be the locality most in favour. The area alienated for rubber planting is some 100,000 acres, of which about 38,000 acres have already been planted. The number of trees is 6 to 7 millions. The output of rubber in 1905 is estimated at 300,000 lbs. Wild rubber seems also to have been much sought after as a royalty of $21,136 was paid on this.

Camphor.—At the Batu Tiga Experimental Gardens, good results were obtained from Camphor plants, the seed of which was obtained from Japan in 1904. Mr. ARDEN calculates that the bushes would give about 3,000 lbs. leaves and young shoots to the acres, producing 30 lbs. of camphor valued at 40 shillings. Two or possibly three crops might be gathered in a year.

Coconuts.—The area under coconuts is estimated at 100,000 acres of which 50,000 are in Perak.

Forestry.—In Negri Sembilan a bad seeding year was experienced Chengal and Merbau seeded well in Perak and Merbau in Selangor. The camphor trees (*Dryobalanops Camphora*) appears to have seeded freely and it is reported that it reproduces itself well, the seedlings being vigorous Giam; Meranti and Bintangor were also good in Pahang. The idea that Chengal does not reproduce itself freely is confirmed. The seedlings appear to die off by thousands.

Selangor shows a decrease in timber owing to the large area of lands alienated and the scarcity of timber outside reserves Pahang showed a decrease of production of 12,000 tons of timber in the Coast districts a rather serious falling off. These Coast districts especially Rumpin river used to be the source of supply of the grand timber Balau, *Parinarium oblongifolium*, a tree which seems to have been almost exterminated. True Balau Timber seems to be quite unprocurable now, and I have rarely seen a tree of this kind for many years.

H. N. R.

Exports from the Straits Settlements, 1905.

Coffee declined by 29,000 piculs or nearly 32 per cent., and prices fell continuously. Smaller supplies were received from the Federated Malay States. Black Pepper rose by 24,000 pikuls or 10½ per cent., but the average price fell 8¾ per cent. There was an increase from Johor of 21,000 pikuls. White Pepper declined by 21,000 pikuls or 20 per cent., the prices falling by 15 per cent. There were increases from Borneo and Rhio but a falling off from Penang. Sago decreased by 54 tons, though Pearl Sago increased by 19,000 pikuls. Betel-nuts increased to 48,270 tons, an increase of 58 per cent. Supplies from Johor and Sumatra increased, and the exports to Calcutta and French Indo-China increased. Cassia, Cloves and Ginger increased, Cubebs and Mace declined. Nutmegs decreased by less than 2,000 pikuls. Tapioca decreased more than 12¼ per cent. Till the middle of the year prices were poor, but later they rose and were 43 per cent. higher on the 31st of December than they were in July. Copra increased enormously, chiefly from the Dutch Islands, but also from Kelantan and Johor. Borneo and India Rubber increased 14,000 pikuls, but Borneo rubber decreased 5 per cent. in value. Gutta Percha increased 7,413 pikuls but considerable quantities of inferior Guttas are imported from Sumatra and are exported mixed as Gutta Percha. Inferior Guttas chiefly Jelutong or "East India Gum" (yet another name apparently for this product) were exported to the extent of 206,500 pikuls, an increase of 22,500 pikuls. This came from Borneo and Sumatra. The increased demand was by the United States.

Para Rubber amounted to 1,658 pikuls (over 221,000 lbs.) as against 88 pikuls in 1904. From the Federated Malay States and Colony came 1,080 pikuls from Selangor, 188 from Port Dickson, 43 from Perak, 154 from Johor and Malacca 42 pikuls. Penang imported 232 pikuls from Perak. This rubber was sent to the United Kingdom 1,457½ pikuls, to Ceylon 85½, to the United States 38, and to Denmark 38½.

Preserved Pines increased; 548,000 cases valued at 2¾ million dollars were sent off, an increase of 100,000 cases, and $318,000. The increased demand was for the United States, China, Germany and Australia.

Gambier exports declined, this product shows a continuous fall year by year.

TWO NEW PUBLICATIONS ABOUT FICUS ELASTICA.

An account of *Ficus elastica*, its natural growth and artificial propagation by E. M. COVENTRY forms the subject of Forest Bulletin No. 4, of Calcutta. It is a pamphlet of 35 pages illustrated with three photographs of the Rambong tree and methods of tapping it. The notes are made on the plant as cultivated and wild in Burmah and Assam. It is interesting to know that it grows best in Burmah at an altitude of 2,500 to 3,500 feet, and grows in abundance in the Lonau-hills at an altitude of 5,200 feet, and even may survive severe winter frosts. It is said to require perfect drainage about the roots and looseness of soil, plenty of light and a hot steamy atmosphere. Gravel or sand does not suit it as the collectors say it produces less rubber in such soil. Nor will it thrive in swampy land even when planted on mounds, nor does it grow well in grass land where there are no trees. Propagation by cuttings is described but it is said that these do not throw out aerial roots, and marcots (or as they are called in Burmah gooties) do not seem to be very successful in Burmah, though they certainly have done very well in the Malay Peninsula. Seedlings planted in forks of trees has proved too expensive and not very satisfactory, and on split stumps or mounds seemed the best method. Seed from young trees will not germinate and those from over 20 years old are what is required. It is gathered from beneath the trees when the birds are feeding on them, the bird droppings as well as the ripe figs being swept up each day. For the seed which has passed through birds is the best. (This is I believe the case in the Waringin, Ficus Benjamina and other figs which are difficult to raise though seedlings from bird droppings readily come up everywhere). Seed can be preserved for many months by mixing it with pounded charcoal.

Experiments in raising seed in seed-beds are detailed. Seed vegetable loam, ash and kerosine are mixed, the latter to prevent the ants from carrying off the seed. (In the Straits Settlements we find it better to raise the seed in boxes over water, the use of kerosine to protect seeds from the attacks of ants has not proved very successful). Transplanting nurseries, and planting out are described. All the planting seems to be done through forest much as we plant gutta percha here. *Tapping* is done with a V shaped gouge about 1¼ inch wide, with the aid of a small wooden mallet. The cuts are made horizontally on alternate sides of the branches, care being taken not to cut the cambium. The cuts are 15 inches apart and go more than half, but less than two-thirds of the circumference of the bough. No bough less than 2 feet round is tapped. Arrow-shaped and oblique cuts give less latex than horizontal ones. The latex coagulates in the cuts and is stripped off when dry. The overflow is caught on well dried bamboo mats laid on the ground and it has been the custom to stain these mats with a decoction of 1 part of rubber bark in 60 parts of water, boiled for 5 hours so as to colour the mat rubber like that of the bark rubber. The mats are used over and over again till they are thickly coated with rubber which is dried in the sun usually for two days, and peeled off. Catching the latex in tins or cups has been found to › expensive. The latex in the cuts is usually dry enough to be peeled out in three days. This is classed as *A* that which runs down the tree and is collected from the trunk as *B* and these take ten days to dry, mat rubber *C* takes a month. When dry the rubber is pressed with a screw-press into an 18 inch cube and packed in cotton cloth after 24 hours. The greatest yield is from November to the middle of January, the colder the weather the greater is said to be the out-turn. Rain is injurious. The yield of small trees up to 3 or 4 feet girth in Assam is too poor to be worth tapping and trees will not stand annual tapping, once in three years is as much as they will stand. Twenty-one selected trees gave in three successive years 46, 48 and 9 lbs. of rubber, and this falling off of yield in the third year seems to be general whether old cuts are re-opened or new ones made. The out turn of rubber per acre seems very variable, thus in Java 72 acres of 5,200 trees tapped at 14 years' age gave after 7 years work 71 lbs. rubber per annum. In Charduar, trees from 23 to 25 years old gave about $\frac{1}{6}$th of this amount.

Tables of growth in height and girth are given from which it appears that the average girth of a tree at 7 years is 2·35 feet, which is the earliest age at which it is worth tapping. The amount of resin in the rubber of different plantations varies 3 to 7 per cent. in normal Ficus elastica to as much as 19 per cent. in the Charduar rubber.

THE CULTIVATION OF FICUS ELASTICA.

By Claud Bald.

This is another little pamphlet published by THACKER, SPINK & CO., Calcutta, and illustrated by photographs.

The author notes that the yield is not comparable to that obtained from tropical rubbers and the time it takes to reach maturity renders it prohibitive as an industry by itself but the cost of planting is so small and the possible return so substantial that it is a really sound investment for those who have available any suitable waste land. Low lying land or land apt to become sodden, and climates subject to long droughts he condemns, as also land too dry. He does not recommend sowing the seed in beds, but in boxes covered with glass plates, and this really appears to be the best method, though if the boxes are shaded, the glass plates are not necessary. He condemns the method of growing the trees through forest or shading them by other trees, and states its growth is retarded in proportion to the amount of shade given. In the earlier planting 25 feet apart is considered sufficient but latterly 35 feet has been the rule, 40 or 50 feet would not be too much for a rubber forest. The roots of a twelve year-old tree have been known to reach a radius of 60 feet thus occupying a circle of ground 120 feet across.

He quotes Mr. GUSTAVE MANN as saying that the Government trees would reach maturity in 50 years and might then be expected to yield 10 lbs. rubber at each tapping. This is taken however, only every second year, which consequently gives 5 lbs. per year per tree, or at 41 to the acre, 35 feet by 35, 205 lbs. per annum. This return does not come up to that of Para rubber by a very long way and as is well known the Rambong rubber does not fetch so high a price.

DYES AND DYEING AMONGST THE SEA DYAKS OF SARAWAK.

By J. Hewitt.

Not many years prior to the advent of Europeans to this country woven cloth seems to have been little used by Dyaks and quite possibly it was unknown to the majority of them: their scanty garments and their blankets were made of the beaten bark of the Tekalong (Artocarpus sp.) tree. Of late years however the primitive bark cloth has been largely rejected in favour of the more ashionable and more durable woven cloth with its ornate patterns. Various vegetable fibres, *e. g.* the pine apple and the Lembah (*Curculigo villosa and latifolia*) have been utilised in cloth making but at the present day their home-spun fibre is either that of the Kapas (*Gossypium herbaceum*) or of the Kapok (*Eriodendron anfractuosum*).

At the same time as they adopted the art of weaving—copying no doubt from their more civilised cousins the Malays—they also learnt the crude processes of dyeing then in vogue amongst the Malays; I suspect that the dyes and dyeing processes now in use amongst the Sea Dyaks are substantially the same as those of the Malays centuries ago. For a long time Malays have shewn a preference for the coloured threads of European and Chinese origin and at the present day Dyaks too purchase much of their material always dyed before it is woven, ready prepared for weaving, from the bazaar. This probably is partly on account of the superiority in colour of this bazaar material, for their home dyed threads are dull in colour, lacking the brilliancy of a fibre which is dyed by modern scientific methods.

The dyes used are mostly infusions of leaves or bark and these are taken from many different plants.

The colours produced even in fresh material are not very bright and as they use no mordants, except the lime of the sireh box their colours are apt to fade.

The rather large number of plant extracts employed in dyeing, suggests repeated experiments on their part with a view to the discovery of better colours.

There is great uniformity in the colours of cloth which is entirely of Dyak origin; this is partly but not entirely on account of their predilection for particular colours.

Perhaps the best colour they have produced is red, and various shades of this colour and of browns figure largely in Dyak material; the commonest red is brick-coloured, brighter reds and scarlet being unobtainable from their dyes.

The blues are very inferior; light blue and violet is almost wanting but they produce various shades of dark blue passing on to black.

They have not produced a real green and whenever this colour appears in a Dyak cloth it is certain to be that of foreign thread.

The principal plants used in dyeing are—Tarum, Jangit, Engkrebai, Kunyit, Intamu and Engkudu. Tarum is the indigo plant *Indigofera tinctoria.* It is widely spread throughout the inhabited parts of Sarawak but is not indigenous. The leaves of this Tarum are boiled with water for a long time until the liquid becomes rather sticky; then sireh lime is mixed with it and the mixture well stirred up. This liquid is now ready to be used as a blue dye; the fibre to be coloured is simply soaked in the liquid for a long or short time according to the depth of colour required. As a rule the steeping in this liquid is repeated several times the material being dried after each immersion; if the operation be repeated five times the colour produced is of course deeper than that after only three washings. By using a weak solution of Tarum or by limiting the amount of lime a lighter blue can be obtained, but as this has a very washed out appearance it is not appreciated by Dyaks. Tarum is thus used for dyeing cloth, for imparting a black colour to rotan fibres, and in colouring the rotan waistbands worn by women. Very frequently the material is washed in this way after it has already been treated with other dyes; when the application of Tarum follows that of Engkudu a kind of purplish black is produced; if it follows that of Engkrebai a brownish black results.

Jangit is the name given to several species of *Xanthophyllum*; they distinguish three species which in order of merit are Jangit Api, Jangit Engseruai and Jangit Bruang. The bark of these Jangit trees is sometimes used alone to produce a yellow dye but more usually is mixed with Engkudu bark to make their most valued red dye.

The yellow dye is prepared by allowing the dried bark, broken into small pieces, to digest for a long time with boiling water. By soaking cloth fibre in this liquid an inferior yellow is produced.

The liquid used for producing a brick-red, very characteristic of Dyak cloth, is prepared by boiling with water a mixture of Jangit bark and young roots of the Engkudu (*Morinda tinctoria*). Before dyeing their fibres in this liquid the material is subjected to a preliminary treatment as follows, in order to make the colour take:—In a large tub containing hot water the following substances are intimately mixed—Garam Apong (salt of the Nipah palm), Minyak Kapayang (oil of *Pangium edule*), Intamu (rhizome of *Curcuma* sp.) in small quantity, some Kunyit (rhizome of *Curcuma longa*), some Liah, (ginger—*Zingiber officinalis*) and some Chikur (*Koempferia rotunda*) rhizome.

Into this liquid concoction they put the material to be dyed and often there is in this tub sufficient thread for the making of a score of kirtles. For 7 or 8 days the thread is submitted to the action of this liquid, but every afternoon it is taken out of the liquid and allowed to dry in the sun, to be afterwards replaced in the liquid. When the woman in charge considers that this stage of the process is completed, the material is taken out, carefully washed in water and then dried in the open air. And now being ready for the dyeing proper it is soaked in the extract of Engkudu and Jangit until the desired colour is assumed; here as before to produce deep colours, they expose it to the action of the liquid a number of times, drying in the intervals. Cloth dyed red in this way is much more highly valued than cloths dyed by other simpler processes, the colour being a brighter red and more permanent.

The formula above given for the first wash liquor varies a little, sometimes including other ingredients Gurah (*Sapium Indicum*) leaves for instance. After treatment in this liquid the fiber has a dirty yellow colour, and in making up the design, part of the material is left thus coloured, the rest being subjected to the action of the red dye. The preliminary treatment appears to be an essential part of the process but why a liquid of that composition should act as a kind of mordant is not obvious.

It is noteworthy that they attach particular importance to the Garam Apong: ordinary salt will not produce the desired effect. The Composition of Nipah salt (*vide* E. SMITH—*Sarawak Gazette, July, 1906.*) is—

Sodium chloride ...	... 74·3 %.
Potassium chloride ...	... 10·2 %.
Potassium sulphate ..	... 13·3 %.
Potassium Carbonate	... 1·6 %.
Organic impurities ...	... ·6 %.

A simpler and quicker method of red dyeing is by means of leaves of the Engkrebai (*Psychotria viridiflora*). In collecting these leaves it is important to choose only old ones, preferably those which are yellow from age. The leaves are boiled with water and when the liquid is sufficiently concentrated, powdered sireh lime is added; the lime must not be added too early or the liquid is spoilt. Cloth is dyed red by soaking in this liquid for a sufficient length of time. This colour is not much liked by Dyaks as it has a faded appearance: however if the leaves used have been well chosen quite a passable red brown results and this they prefer before the dull red produced when young leaves are used. Sometimes they immerse the material in the hot watery extract of Engkrebai leaves alone, when the resulting colour is a red brown: in the absence of lime however this colour is not permanent.

I am told by Dr. HOSE that Dyaks sometimes use as a red dye the liquid produced by mixing lime with Kunyit solution, when as in the wellknown turmeric test for alkalies, an immediate change from yellow to brown takes place throughout the liquid.

Other inferior reds can be obtained by using extract of Engkudu roots with or without lime and without any such preliminary treatment as before described; without lime a dull bed brown results and with lime a brick red. It is not a permanent colour.

Much of the yellow fibre of a Dyak cloth of to-day was purchased as such from the Chinese bazaar. This is because they have not themselves produced a permanent yellow. Intamu solution has been largely used by Dyaks but although the colour when fresh is pleasing, yet it fades much after a few months' time. Usually the fibre to be dyed yellow is soaked in Intamu solution but sometimes they simply rub the moistened rhizome along the thread. The allied Kunyit is often preferred before Intamu its yellow being more permanent; the method of working is the same in the two cases.

Rather a curious formula for a black dye is, leaves of the Sibau (rambutan) tree boiled in water together with mud from the river banks. It is in common use for dyeing cloth fibres; it does not however yield a good black.

If Gurah leaves be boiled in water with mud, the resulting liquor can be used as a blue dye but the colour is not so good as that of Tarum: if this dye be used on fibre which has been coloured red by Engkrebai a black or blue is produced.

As already stated the fibre is dyed before it is woven and as most of their cloth has figured patterns the processes of dyeing and weaving are rather intricate. The web of undyed thread is stretched out on a long rectangular wooden frame and the pattern is occasionally sketched but usually gradually developed as she works on the warp. The weft is of a uniform colour throughout, being often brown or red, and taking no part in the formation of the pattern.

Let us imagine a case where the finished cloth is to have a red ground colour the design to be in 'black' and 'white'. The woman artist takes up a number of threads from the warp in that portion of the pattern which is to be 'white' and she tightly binds round these threads with fibre of Lembah; she continues thus until she has tied up all the white portion of the pattern. Then, after removing the material from the figuring frame, she exposes the whole to the action of the dye Engkudu and Jangit solution—the whole of the warp having previously been subjected to the action of the preliminary wash liquor.

The result is that those portions which are tied up remain 'white' whilst all the rest is dyed red. This having been satisfactorily accomplished the warp is dried and again put on the frame. She now proceeds to tie up also in a similar manner all those parts which are to remain red and then the whole web is immersed in the Tarum liquid: the exposed parts are thus dyed 'black' in the manner previously described. When this process is complete, the web after drying, is put on the loom preparatory to weaving, and the Lembah fibre is removed; the finished pattern is now clearly depicted on the warp. The dying of such a pattern occupies the leisure time of a month or more.

When the cloth is to be simply striped—with no design—there is of course, no necessity for any tying up, as the threads of different colours are dyed separately.

Analogous to these processes of dying is their staining of rotans. Sea Dyak women often wear waist rings of rotan and these rings are sometimes coloured entirely red, and sometimes they are coloured alternately red and yellow; the latter effect is obtained by first soaking the rotan in a watery extract of Jirak (*Symplocos fasciculata*) leaves for one or two months which stains the material yellow; then it is taken out and at frequent intervals along the length of the band it is tightly bound round with vegetable fibre after which it is put into boiling Engkudu solution. The result is that all parts exposed to the Engkudu liquor are stained red whilst the parts protected by the encircling bands remain yellow.

There are probably other formulæ in use amongst these Sea Dyaks, whose lack of originality coupled with an admiration for most things foreign, leads them to copy extensively the customs of people with whom they come in contact: but in the preceding account I have tried to give a description of the methods in general use, and have made mention of all the more important dyes now known to Balau and Sarebas Dyaks.

JOHN HEWITT.

MINUTES OF THE MALAY PENINSULA AGRICULTURAL ASSOCIATION.

A general meeting of the Malay Peninsula Agricultural Association was held on Tuesday June 26th at 5, Weld Quay, Penang, the following members being present.

The Hon: J. TURNER, President, in the Chair.
Mr. T. BOYD, Vice-President
,, T. SYMONS
,, A. CRAWFORD
,, G. STOTHARD
,, W. M. MILLER
,, D. RITCHIE
,, G. PALMER
,, G. PALMER (Junior)
,, H. SPERLING
,, WILSON
,, M. H. GRAHAM, Acting Secretary.

The minutes of the last meeting were read and confirmed.

The President asked what success had attended the effort to obtain medically examined free coolies. The Acting Secretary replied that so far not a single one of these coolies had come over and that Mr. DAVIES, the Association's Agent at Negapatam, held out no hope of getting any unless the recruiters fee was raised from that now offered, *viz.*: Rs. 15 to Rs. 24 the same as for Statute Immigrants as the recruiters had to take the same risk of rejection by the doctor in both cases.

After some discussion as to the fitness of the free coolies now coming over without medical examination Messrs. PALMER and SPERLING decided to each take a trial shipment of twenty-five.

A letter dated 29th March from the Secretary of the United Planters' Association was read in answer to this Association's Secretary's letter of 8th March giving its views on the necessity for levying an acreage tax to cope with the Immigration difficulty and of asking Government to form a Labour Bureau. In it full sympathy with these views was expressed.

Mr. TURNER said that many people at home who are floating rubber companies seem to think that the labour supply in the country is ample for its need and entirely overlook the fact that a large proportion has to be imported. That this fact led to keen competition for the free labour already in the country and that even now the rate of wages was rising. This condition would undoubtedly become more and more acute as rubber came into bearing. For to tap one acre of rubber at least one man would be required every day year in and year out, whereas that same man could fell fifteen acres in a year.

Malays as tappers were then discussed the unanimous opinion being that they did excellent work but, owing to their unwillingness to turn out regularly, were too unreliable to be entrusted with this important work as trees in bearing must be tapped regularly.

It was said that Javanese had proved to be excellent tappers.

Mr. SPERLING said that Jebong Estate had had a good deal of sickness among its Javanese and that their work there had not been very satisfactory.

Messrs. BOYD, CRAWFORD and STOTHARD said their experience was that they had done excellently on the estates under their management and that they were very pleased with them.

Mr. STOTHARD asked if it were possible to again approach the Kedah Government with a view to securing its co-operation in arresting deserters crossing the boundary between Kedah and the Province. It was pointed out that the last time this was done, *viz.* June 28th, 1905, the Rajah Muda's answer was that the Kedah Government was powerless to take any steps in the matter under the treaty in force between it and the Colony. It was decided to send a copy of the correspondence to the consul and ask for his advice.

Mr. SPERLING asked if there was any limit to the *ad valorem* export duty which the Federated Malay States Government could levy. He mentioned the fact that it had just been raised to 2½%. Mr. TURNER thought this was the limit but it was decided to write to the authorities and enquire.

Mr. SYMONS said that he had three times summoned for desertion men who had left the estate without giving a month's notice, and that each time the Magistrate had dismissed the case saying that as the men were paid at a daily rate they were day-labourers although they only received the money monthly. Lawyer's advice had been taken and the Magistrate's notes had been called for. It was unanimously decided to instruct a Lawyer to watch the next similar case on behalf of the Association.

The President asked when the prize essays would be ready for publication and was informed they were still in the hands of the printers but that they might be expected shortly.

Mr. TURNER said that during his absence in Europe Mr. BOYD had acted as President of the Association and he thought the members present would like to put on record their appreciation of his services. Mr. BOYD responded suitably.

This concluded the business of the meeting which terminated with a vote of thanks to the Chair.

MALAY PENINSULA AGRICULTURAL ASSOCIATION.

GENERAL MEETING IN PENANG

EFFECT OF RUBBER BOOM ON LABOUR.

A general meeting of the members of the Malay Peninsula Agricultural Association was held yesterday at the Sugar Estates Office, No. 5, Weld Quay. The Hon. JOHN TURNER presided, and there were also present Messrs. T. BOYD (Vice-President), G. STOTHARD, D. RITCHIE, A. CRAWFORD, J. SARGANT (Secretary), and M. H. GRAHAM.

The Minutes of the previous general meeting were read and approved.

The first item on the agenda was to pass last year's accounts.

It was explained that the small loss in recruiting was occasioned by the cessation of emigration while, at the same time, the establishment expenses had to be kept up.

Mr. BOYD proposed that those who had had coolies last year pay $1.50 per coolie, as an extra charge to make up the deficit.

Mr. BOYD'S suggestion was agreed to.

The Secretary said that the Association had to pay to the Madura Co. a commission of 2½% on the free passage tickets given by the Federated Malay States Government. They would have to make that charge now for all coolies that were received last year and sent to estates in Perak.

Mr. STOTHARD then move that the accounts for the year ended on 31st December last be passed.

Mr. BOYD seconded, and the motion was agreed to.

The next item was to consider whether the recruiting fee should not be raised.

The Secretary read the following letter on the subject :—

NEGAPATAM,
February 17th, 1906.

The Secretary,
Malay Peninsula Agricultural Association.

DEAR SIR,—I am in receipt of your letter of the 3rd instant.

I again have to regret the small number being shipped by this steamer. It is partly due to the Madras people sending no coolies and partly to the large number who refused to emigrate after arriving at the depôt. In all 18 coolies refused to emigrate. I am having a lot of trouble with the recruiters as they are most dissatisfied at present.

They send me down a poor class of coolie and then they complain of the large percentage of rejections. Just now, too, the Natal and Fiji agencies have increased their commission and are taking numbers of coolies recruited for us. The Natal and Fiji recruiters pay our men cash down for coolies and they find the system very profitable. We have, of course, no remedy except the cancelling of the recruiter's licence and that does more harm than good. Also, some clever man among them has pointed out that, when the Straits commission was agreed upon, it included two classes of coolies and that now we only accept class I, the commission ought to be raised. From their point of view I suppose that this is only just.

I have also to regret that the batch of 40 coolies I expected has been passed for Natal, but as they were to be given me by a Natal recruiter I can do nothing.

For the next shipment I have been promised certainly 75 coolies and, as I also intend going to Madras for four or five days to see what I can do with the people there, it is possible we may get them.

Yours truly,
A. DAVIES.

Mr. BOYD asked if the Government was getting many coolies.?

The Secretary replied that the Government was not getting all it wanted.

The Secretary read the following letter from Mr. CLAYTON :—

INDIAN IMMIGRATION OFFICE,
Penang, *27th February*, 1906.

SIR,—I have the honour to call your attention to the fact that, although the numbers of indentured immigrants coming over from India have diminished, yet "free" coolies are still coming in considerable number.

It has occurred to me that your Association might like to try the experiment of using some of the free tickets supplied to you for "free" as well as Indentured coolies.

I would not recommend that any coolies who have not passed the medical examination at the Nagapatam depôt should be imported but I am prepared, should you so desire, to request Dr. FOSTON to examine any coolies that your representative in India may present, and pass them through the depôt whether they are coming as Indentured coolies or as "free" coolies.

The usual fee of rupee 1, per head, will be paid for the examination of these coolies, and the ordinary precautions in the way of indentification marks will be taken to prevent substitution.

I have the honour, etc.,
L. H. CLAYTON,
Acting Superintendent of Indian Immigrants.

The Secretary,
Malay Peninsula Agricultural Association.

The Chairman said that he thought it would be well to ask for "free" coolies to be sent over.

After some discussion as to the terms of engagement,

Mr. BOYD proposed that a certain number of "free" coolies to be got over on condition that they pass the medical examination. He himself was quite willing to take some.

Mr. STOTHARD said that, now that they were getting over "free" coolies, he would ask them to arrange so as the coolies would sign a promissory note on their arrival in Penang for the refunding of passage money and advances.

Mr. CRAWFORD seconded, and the motion was carried.

The Secretary observed that Mr. DAVIES expected to send 75 coolies by the next steamer. It would be better to wait a week before deciding.

The Chairman suggested that Mr. DAVIES be instructed to consult with Dr. FOSTON as to the best way of increasing the number of coolies coming over and as to whether increasing the recruiting fee is essential.

This suggestion was agreed to.

The next business was to appoint a Secretary to act for Mr. SARGANT while he is away on leave.

Mr. M. H. GRAHAM was, on the motion of Mr. BOYD, seconded by Mr. RITCHIE, appointed to fill the post.

At the general meeting held on the 24th January, 1905, it was agreed to offer two prizes for essays on "Rubber, its cultivation, mode of tapping, manipulation, etc.," and at a committee meeting held on 21st March, 1905, it was proposed to give a gold medal, together with a money prize, for the best essay on Para rubber and the same for the best essay on gutta rambong. Messrs. H. N. RIDLEY, Director of Botanic Gardens, Singapore, and J. B. CARRUTHERS, Director of Agriculture, Federated Malay States, kindly consented to act as examiners.

The Secretary yesterday intimated that the essays, all dealing with Para rubber, had been received and passed on first to Mr. RIDLEY and then to Mr. CARRUTHERS. These two gentlemen differed on technical points as to which should be awarded first prize.

After some discussion, the allocation of the prize was referred to the essay committee.

The Chairman then said: I think it must be obvious to all of us that our position with regard to labour is becoming more and more acute and that unless very stringent measures are taken we may soon be involved in what may be called a labour war. Companies innumerable have been and are being started for rubber cultivation and while the promoters of these are promising their shareholders to plant up thousands of acres within a given time there is a marked want of foresight as regards the labour required for undertaking this work. The result will be that in the hope of carrying out their undertakings, higher wages will be offered to attract the labourers already in the country. That sufficient labour can be imported there is no doubt, but it means trouble and expense in bringing coolies to this country and acclimatising them. In order to avoid what would certainly prove a disastrous competition and avert ruin from many of the undertakings which would otherwise go under I would suggest that an acreage tax over the Straits and Federated Malay States be levied, the money from which to be expended solely on the importation of suitable labour. For this purpose it would be necessary for Government to form a Labour Bureau to import coolies and distribute them to the different employers in proportion to the amount of tax paid by them. Before approaching Government it would be well to get the views of the United Planters Association in order that, if possible, joint action might be taken.

Mr. BOYD proposed that the Secretary be asked to write and find out the views of the United Planters Association on the matter.

This was agreed to.

This concluded the business of the general meeting.

The essay committee afterwards met and decided to divide the prize between "Wars" (*nom-de-plume*) and Mr. A. M. SAWYER, giving a gold medal to each.

The Labour Bureau also met later.

It was agreed on the motion of the Chairman (Hon. J. TURNER) to approach the Netherlands-India Government with a view to having the rates of pay for future importations of coolies reduced.

The Chairman said that the favourable views expressed just a year ago about Javanese coolies held good to-day. They were in some ways more satisfactory than Klings. Sickness among them was rarer and, consequently, the death-rate was lower. Though the initial cost of importation was greater, the ultimate expense worked out cheaper than for Tamil labour.

Mr. BOYD concurred, as did Mr. STOTHARD who said that the Javanese, unlike the Klings, never scamped their work. They had Javanese women in the factories on Malakoff, and he did not know what they would have done without them.

The Secretary (Mr. SARGANT) reported that the number of Javanese imported in 1904 was 1,099; in 1905, 410; and for the present year, so far, 200.

The accounts of the Labour Bureau for last year showed a credit balance of $105.71.

The accounts were passed.

Mr. M. H. GRAHAM was also appointed to act as Secretary of the Labour Bureau during Mr. SARGANT'S absence.

This concluded the business and a vote of thanks was accorded the Chairman.

KOALATEX IN RUBBER COAGULATION.

HAMBURG, *Hoppensack,* 8.

There exist several methods for the transformation of proto-rubber, which finds itself in each rubber milk, into rubber. Even the best rubber milks do not give good rubbers, if a bad method of preparation or a non-practicable coagulator has been used. All rubber milks contain a bigger or small proportion of foreign substances, which, partly, may be easily removed. The most trouble is caused by the albuminoid matters which accompany the proto-rubber and, if not carefully removed, cause fermentation, overheating and a bad smell of the rubber. In fact it is very difficult to remove quantitatively the albuminoid matters even from Hevea rubber milk. Therefore it is necessary to use as coagulators only such chemicals as have a high disinfecting and preserving action. Liquid acids as sulphuric, hydrochloric and acetic acid are not practicable for use of plantations which mostly do not have good communications, and the transportation of these liquid acids is very dangerous and costly. Besides, these acids have nearly not at all any disinfecting or preserving value, and they do not prevent the becoming black of some kinds of rubber, especially after drying. There exists some organic acids which have not only a good coagulating action, but also have the superiority of being efficacious disinfectors and preservators, but their prices are extremely high. Owing to the far-seeing examinations and experiments of a highly prominent crude rubber expert the rubber coagulation problem had been solved by the compound "Koalatex," which is a good acting coagulator, gives light coloured rubbers, which remain light after being dried. Koalatex prevents must, is easily transportable and safe, and has a low price, $19.50 per 100 lbs. or £4.10.0 per cwt. f.o.b. Hamburg, package included, in tins and cases.

LEHMANN and VOSS,
Manufacturing Chemists.

PARA RUBBER IN SAMOA.

In the Consular Report for Samoa for 1905 is the following account of rubber planting in Samoa. Mr. T. ANDREW, a planter, reports—"In 1904 I supplied your yearly report with a few remarks on the cultivation of *Hevea braziliensis* in Samoa. Since then the trees have grown rapidly, not so much in height as in girth, they are just six years old from the seed, measuring 25 consecutive trees at three feet from the ground, the largest tree measured 24½ inches in circumference; the average of the whole was 17½ inches. The measurements are by no means insignificant when compared with those made at the experimental gardens of the different districts within the zone of rubber culture. The trees in question are planted

15 by 15 feet among cocoa trees at an altitude of 1,100 feet above the sea. The aspect is favourable and the distribution of rain is more even than on the low lying lands which have the same aspect. Some of the trees are being tapped and the result of yield and quality of the rubber will be looked forward to with interest. Other companies under able management have commenced operations here notably the Berlin Caoutchouc Company at Saluafata near Talefa with an area of 6,000 to 7,000 acres. Their first clearing of 500 acres is now ready for planting out and they have about 1,000,000 young Hevea plants growing in the nuseries. The situation of this estate is ideal. A gradual ascent from the sea with a maximum height of say, 600 feet above it. The rainfall is evenly distributed throughout the year. The soil is splendid containing sufficient clayey mixture to retain moisture in the event of prolonged dry weather. The whole is almost encircled by a high range of mountains 1,500 to 2,000 feet in height.

Further notes on the rubber cultivation here are printed in Tropical Life, June 1906. The cultivation started in 1900 with 1,000 seed sent by post in slightly moistened charcoal packed in tins, of which about 40 per cent. germinated. Chinese coolies are being used. They contract for three years and a cash deposit of £7 10*s*. for each coolie ordered is required. The average amount paid to the labourer inclusive of fare each way is 50 marks a month. This seems a very high rate of wages. Samples of the rubber sent to Messrs. FIGGIS & CO. were reported by them to be sticky, soft and immature, probably due to the rubber being sent before it was properly dry.

H. N. R.

RUBBER IN UGANDA.

In the report of the Forestry and Scientific Department of Uganda by Mr. BROWN, it is stated that the Para rubber trees have made satisfactory growth during the year. The largest tree is 4½ years' old, and 27 feet 6 inches tall with a girth of 12½ inches at 4 feet from the ground. Trees 2¼ years old are 17 feet tall and 5 inches in girth at 4 feet from the ground. (Measurements are usually taken at 3 feet from the ground, and should be so as it is not easy to compare growths if the measurements are taken at different heights). There are it seems about 5,000 Para plants in the country.

Castilloa has been killed by a boring longicorn beetle in the same way as it is killed out here, but by a different species from ours.

Funtumia elastica which is wild here was propagated and samples of rubber sent to HECHT LEVIS and KAHN for report. The best were those coagulated with heat and citric or acetic acid and valued at 4/6*d*. per lb., without acids the rubber proved to be imperfectly coagulated and valued at 3/2*d*. to 3/6*d*. per lb.

This rubber does not seem a very inviting cultivation.

Meteorological tables are given in the report showing that the rainfall varies from 47·02 to 65·74 inches per year. This is very low compared with what it is in what we consider Para rubber country.

H. N. R.

MALAY DRUGS—Continued.

FEBRIFUGES.

The Malay is not very accurate in his diagnosis of fever and often talks about suffering from it when he has merely a feverish cold or is generally speaking slightly unwell with a rise of temperature, but shivering fever and the more acute forms of malaria he generally identifies correctly. For these fevers he uses a variety of external and internal applications.

Perhaps the best drug known to the Malay for fever is the Bidara Pahit or Penawar Pahit, *Eurycoma latifolia*, Jack belonging to the order *Simarubeæ* and allied to the Bitterwood *Quassia amara* and Quassia chips, *Picraena excelsa*. Like all these plants it contains a bitter principle which permeates the whole plant, it is the bark of the root however, which is the part used.

HOLMES gives Penawar Pahit as *Strychnos colubrina* and gives an account of its use by Malays and others. It is probably to be found in the Kling shops, but I never came across it and the plant is not wild here. Probably the Penawar Pahit described by him as used by the Malays as a febrifuge is *Eurycoma* which is well known in Johor whence he derived his specimens.

Artocarpus integrifolia (*Urticaceæ*) Akar Nangka Bubor. The roots of the Jack tree boiled, ground and drunk for fever with delirium after three days.

Sauropus albicans (*Euphorbiacæ*) "Chekop Manis." A common vegetable, the root is used for fever, being ground up and the decoction drunk. It is also used in difficulty of passing urine, so probably like its allies *Phyllanthus* it has diuretic properties.

Gardenia florida (*Rubiaceæ*) "Akar Bunga China." The roots used for fever with delirium.

Durio zibethinus (*Malvaceæ*) Durian. The roots are used for fever both ground up and rubbed on the body and a decoction drunk after the fever has lasted three days.

Corymbis veratrifolia (*Orchidaceæ*) Kayu Hok (a Semang name). A tall terrestrial orchid with sweet scented white flowers. "Collect the green leaves bruise them in quantity, administer the juice either alone or with the fine scrapings of Akar Bertak. It will cause vomiting. Use for ague (Demum Kura) especially in children, no water to be mixed with the juice. It is customary to cultivate the plant for the occasion." This note and specimen were sent me from Kelantan by Dr. GIMLETTE.

Morinda tinctoria (*Rubiaceæ*) "Daun Kudu (Kelantan) Mengkudu. The leaves and roots boiled in water for ague as a drink and when pounded as an application to the spleen (Kelantan; Dr. GIMLETTE).

Justicia gendarussa, L. (*Acanthaceæ*) Gandarusa. A decoction of the leaves is given as a diaphoretic and febrifuge (HOLMES). The leaves ground up with white pepper are given to a woman for three days every morning for Amenorrhea.

Tinospora cordifolia, Miers. (*Menispermaceæ*) "Putawali." A climber commonly cultivated and introduced from India by the Tamils. A decoction of the root is used as a tonic and febrifuge (HOLMES). It has also long had a reputation as an antidote to insect stings and snake bite. The plant is better known to the Indians than the Malays.

Aglaia odorata, Lour. (*Meliaceæ*) Telor Belangkas. A Chinese bush with corymbs of small yellow flowers very fragrant in the evening. "An infusion of the flowers given as a cooling drink in eruptive fevers" (HOLMES). The flowers are an ingredient in Chinese tea.

Other Febrifuges used by the Malays are:—

Vernonia chinensis, Less. (*Compositæ*). A common village weed known as "Ruku Gajah" and "Sumpu Angin". The roots of which are used in cases of fever.

Anplectrum glaucum, Triana (*Melastormaceæ*). A climbing shrub, the Senduduk Akar or Daniar Bukit.

Melodorum pisocarpum, Hookfil. (*Anonaceæ*). A climbing shrub. Kudunak, *M. manubriatum*, Akar Sumbulut, are used for fever, a decoction of the roots.

Thottea grandiflora, Rottb. (*Aristolochiaceœ*) "Seburut". A shrub with very large purple flowers. The roots of this are a tonic of some reputation.

Alternanther · sessilis (*Amarantaceœ*) "Rumput Aoh." An extremely common little herb with axillary clusters of white flowers. A decoction of the whole plant is used.

Bœckea frutescens, and *Leptospermum Amboinense (Myrtaceœ)* Two shrubs which occur at about 4,000 feet altitude in the hills with narrow stiff leaves, those of the *Baeckea* quite acicular. The leaves are very aromatic and those of *Baeckea* are sold in the shops as Daun Chuchor atap (lit roof sweepings). A decoction of the leaves of either of these is used for fever and lassitude, and simply made as tea by pouring hot water on them make a very refreshing and invigorating drink.

Datura fastuosa (*Solanaceæ*) Kechubong. The leaves heated over a torch are applied to the spleen in intermittent fever (Dr. GIMLETTE).

Azedarachta indica Juss. (*Meliaceæ*) "Bepe" The powdered bark is given in 5-10 grains doses as an astringent and tonic stimulant in intermittent and malarial fever, in dysentery and in convalescence of fevers. A decoction is also used in doses of 1-2 ounces (HOLMES).

Premna cordifolia (*Verbenaceæ*) Buas-Buas leaves and root is a decoction as a febrifuge (HOLMES).

Michelia Champaka L. (*Magnoliaceæ*) "Chempaka Putih" The infusion of the bitter bark is given in lower intermittent fever (HOLMES). Chempaka Putih is however the name given to *M. longifolia* the white Chempaka. Neither plant is wild here but both are cultivated for their fragrant flowers.

Macaranga hypoleuca Mull. (*Euphorbiaceæ*) "Daun Balik Angin" A decoction is used as a febrifuge according to HOLMES, but the native name he gives is that of *Mallotus Cochin chineusis.*

M. javanica "Daun Balik Adap" is similarly used according to HOLMES.

Orophea setosa (*Anonaceæ*) "Pialu" A jungle climber, the roots of which are used.

Cyclea arnotti (*Menispermaceæ*). A decoction of the roots is given.

Ophelia Chiretta. The Chiretta imported from India is sold in the shops for fever.

Ruta graveolens (*Rutaceæ*) Arruda. An infusion given in doses of ½ to 1 ounce as a diaphoretic, and the juice of the leaves applied in ear-ache (HOLMES); rubbed up with turmeric and rice, it is used for the itch under the name of Ubat Gatal.

Tamarindus indica L. (*Leguminosæ*) "Asam Jawa" Tamarinds. The pulp is given in fever in a drink. "The powdered seeds applied as a poultice to boils. A fomentation of the leaves for rheumatism" (HOLMES).

External applications for fever are rather numerous. The drug, if a root is boiled ground to powder and then rubbed over the whole body. The following roots are in use:—*Orophea setosa*, *Coptosapelta flavescens*, Kortp. (*Rubiaceæ*) "Akar Malang". *Clerodendron nutans*, Wall. (*Verbenaceæ*) Muroyan Kabut, *Chloranthus officinalis* (*Chloranthaceæ*) "Samban Paya" and the leaves of *Abutilon indicum*, L. (*Malvaceæ*) "Kambang Lobo", *Limnophila villosa*, (*Scrophularineæ*), *Aristolochia Roxburghiana* (*Aristolochiaceæ*) "Akar ketola hutan," *Cyrtandra acuminata*, Benth. (*Cyrtandraceæ*) "Sugumber putih", *Alsodeia membranacea* (*Violaceæ*) "Melora Angin," roots boiled, are applied for fever.

For what appears to be enteric fever, (Demam Capello), a continuous high fever with diarrhœa, the leaves of Pohon Pejat (*Alpinia*, sp.) P. Chalong (some *Scitamineæ*) and P. Bolla bukit (*Zingiber Griffithii*) are bruised together and rubbed on the body for two days to be discontinued when the fever falls (Kelantan, Dr. GIMLETTE). The specimens sent were only leaves and I cannot certainly identify them.

EXPECTORANTS AND COUGH MEDICINES.

There is a considerable list of drugs used for coughs and colds, several of which at least have diuretic properties.

Abrus precatorius, L. (*Leguminose*) "Akar Saga Betina", Crabs eyes or false liquorice. A climbing vetch with pale violet flowers and round scarlet and black seeds. This has long been known as a cough medicine, but has passed out of the British Pharmacopœia. The natives boil the roots and leaves and chew them with betelnut.

Phyllanthus niruri, L. and *Ph. urinaria*, L. (*Euphorbiaceæ*) Dukong Anak. Small common weeds found on paths and waste ground everywhere. Are used for colds and coughs in children, but also largely for kidney troubles, suppression of urine gravel, gonorrhea and other urinary ailments, being strong diuretics.

For dry cough in children the base of the stem and roots of *P. niruri* with flowers of sweet Basil (*Ocimum Basilicum*) "Ruku Ruku", two slices of ginger rhizome and some sugar candy are boiled together and the decoction is given as a drink.

For urinary troubles *Ph. urinaria* is boiled and mixed with pounded Organ-pipe coral, (*Tubipora)* Bunga Karang, and Sumbu China (the slender pith of some plant perhaps a *Juncus* imported from China) and some sugar candy. It is all cooked together and the decoction drunk daily.

Orophea sp. (*Anonaceæ*) "Supucha Pelandok". Roots chewed with betelnut for coughs.

Dischidia Rafflesiana, Wall. (*Asclepiadeæ*) "Akar Kul", "Akar Bani", the creeping stem of this plant is used in the same way.

Mussaenda glabra, Vahl. (*Rubiaceæ*) "Balik Adup", and *M. variabilis*, Hemsley, "Balik Adap Bukit", is used in the form of a decoction of its roots for cough and its leaves for fever.

Scoparia dulcis Lin. (*Scrophularineæ*), "Te Macao" a twiggy herb with small white flowers common now in waste ground, but a native of Brazil and a comparatively recent introduction into the East Indies. It is a well known cough medecine in its native home, and is used here also for a similar purpose. Mixed with the roots of *Eryngium foetidum*, also a South American plant, carried about by the Chinese, it is used for stomach-aches.

Didymocarpus platypus C. B. CLARKE (*Cyrtandraceæ*). A small shrubby plant with trumpet shaped white flowers with a yellow centre not rare in forests. A decoction of the roots is used for coughs.

Cyathula prostrata (*Amarantaceæ*), "Jarang-Jarang" A common creeping weed in waste ground. A decoction of the roots is given in infantile cough.

Pericampylus incanus, Miers (*Menispermaceæ*). Akar Kelempenang. A hedge row climber, the leaves of which pounded and made into a decoction with those of *Kibessia simplex*, Korth. "Sial Munahon" are used for coughs and asthma.

Plantago major L. (*Plantagineæ*), "Ekor Angin". The roots and eaves of this plant have a reputation for coughs and consumption as the English plant had formerly.

Gmelina villosa, Roxb. (*Verbenaceæ*) Bulangan. A small tree with yellow flowers and acid yellow fruits which preserved in Syrup are given in cases of consumption. According to HOLMES the bark and roots are given as a demulcent and alterative.

Euphorbia pilulifera, L. (*Enphorbiaceæ*) "Gelang Susu". A very common little weed about a foot tall, for which at one time there was a considerable demand in Europe, but curiously its virtues do not seem to have been recognized by natives. It had a reputation for bronchitis, asthma and such lung diseases, and being slightly narcotic assists in procuring sleep for the patient. The late THOMAS CHRISTY wrote, in 1889. "This drug has been sold at 3*s*. 6*d*. per lb. we introduced it originally from Australia, we have been drawing it largely from India. I want plants when they are about 4 inches high with fully grown leaves, just coming into bud full of sap. It wants pulling from the earth knocking off the roots and drying in the shade, when quite dry it wants to be packed in bales and if it is quite safe on account of being dry and the weather is fairly dry it may be hydranlically pressed to save freight."

The natives here do not seem to recognize its value in Bronchitis, but they use the latex to drop into the eye for sore eyes.

E. thymifolia. A small prostrate herb very common in paths is used for coughs

Microglossa volubilis (*Compositæ*) " Ragin". `A climber not very common. A decoction of the leaves is used for colds.

Datura fastuosa L. (*Solanaceæ*). The leaves roughly powdered with or without the leaves are rolled into cigarettes and smoked for asthma. It is suggested in the Indian Pharmacopoeia to substitute it for *D. stramonium.*

Gracilaria lichenoides (*Algæ*) " Agar Agar". Seaweed is used not only as a well known delicacy, in the form of a jelly, but medicinally in coughs and consumption by the Malays. HOLMES points out that there are two Agar-Agars in eastern trade, Agar-Agar karang *Gracilaria lichenoides* which when alive is purplish filiform; and forked, and the Agar-Agar of Borneo *Encheuma spinosum* a purplish red thicker coarser sea-weed covered with short spines.

Hydrocotyle rotundifolia (*Umbelliferæ*) " Pegaga Umbon." The small round leaved species less common than *H. Asiatica* is used for cough in children under the name of " Ubat kanak-kanak batu." It is mixed with sugar candy and Cassia bark (kayu-manis china) and put in a pot which is plunged in rice while it is being cooked. Some is given every morning to the child.

Amaranthus spinosus L. (*Amarantaceæ*). The spiny amaranth, " Bayam duri " often eaten as a vegetable, a common green weed, is used as an expectorant and to relieve breathing in acute bronchitis. It is ground up with *Usnea barbata* (Lichen) Tahi Angin, kayu manis china, (cassia bark) and memplas hari (*Alyxia stellata* bark) and cooked in the same way as the *Hydrocotyle* is. The medicine is known as Ubat kanak-kanak pukul lendir.

Tabernæmontana coronaria, L. (*Apocynaceæ*) Bunga China. A commonly cultivated white flowered shrub. The leaves are ground up and mixed with sugar candy, and water and put out in the dew for one night. The decoction known as "Ubat Serak" is given for coughs.

Elephantopus scaber L. (*Compositæ*) "Tutop Bumi". A common South American weed in grass plots and waste ground, with small pink flowers. A decoction of its roots is used for coughs, but it also enters into many other remedies. HOLMES gives it as an anthelmintic for ascaris but he gives the native name as Sembong which is *Blumea balsamifera*.

Emilia sonchifolia Dec. (*Compositæ*), "Tetumbak merah". "Ketumbi jantan", is sold in the herb shops as a cure for coughs. A decoction of it is said to be good for consumption. A common weed with pink flowers.

Vitex Lagundi, *V. trifolia* L. (*Verbenaceæ*), "Lagundi". A large or small shrub with glancous aromatic leaves and blue flowers. A popular medecine, the leaves ground with garlic, pepper, turmeric, and boiled rice are made into pills and given for consumption, and the patient is also bathed in a decoction of its leaves. The leaves ground up with *Nigella sativa* seeds (Jintan hitam) and onions are put on the forehead for headache (ubat pitam).

Hibiscus Rosa-sinensis L. (*Malvaceæ*), Bunga Rayah. The flowers are used in the form of an infusion with sugar-candy as an expectorant in bronchitis (HOLMES). They are demulcent, and are used in the same way for gonorrhea. It is supposed to be essential to put the soaking petals out in the dew all night.

Polyporus sacer, (Fungi) "Susu Rimau". The "tiger's milk" is the sclerotium of this fungus, found in the form of irregularly shaped rounded masses in forests, usually in decaying wood. It has a great reputation for consumption and colds, and is usually expensive on account of its rarity. It appears to contain a quantity of pectin, but the very small doses given by the herb doctors, on account of its costliness can hardly be very efficacious. (*See* an article on the plant, Straits Ass. Soc. XXIII).

RHEUMATISM AND LUMBAGO.

These ailments are usually treated by rubbing the affected parts with decoctions of various roots or leaves, or with these ground up after boiling. Some of them have aromatic properties, others are stimulant or rubefacient.

Dryobalanops Camphora, Gaertn "Kapur Barus". The oil of Camphor is produced in hollows of this tree, as also is solid camphor. It is a turpentine known as borneol and appears to have much the same effect as spirits of turpentine. It is obtained in Borneo, Sumatra, Johor and Selangor. The oil which is very expensive is valued much as a liniment for rheumatism.

Melaleuca leucadendron (*Myrtaceæ*) Gelam. Kajuput oil is used for rheumatism as it is everywhere. The tree is very common in

Malacca, but the oil is only made in Buru and other islands of the Moluccas.

Cerbera Odollam (*Apocynaceæ*) Buta-Buta. The large red fruits of this common sea-shore tree are used when fresh to rub on the legs in cases of rheumatism. They contain a quantity of poisonous latex as does the rest of the plant which seems to have a rubefacient action on the skin.

Agnilaria malaccensis, (*Thymeleaceæ*) Gaharu. A decoction of the bark is used in rheumatism (HOLMES).

Podocarpus neglecta, (*Conifere*) 'Salada" (probably miscopy for S'tada). A decoction of the leaves is used as an alterative in rheumatism and painful joints (HOLMES).

Stachytarpheta indica, L. (Scrophularineæ) "Selasih dindi". A shrubby weed with blue flowers in spikes. The leaves are rubbed on a sprain or bruise.

Memecylon dichotomum, Clarke (*M. Ridleyi* Cogn. of previous list) *Melastomaceæ.* A small tree, the roots are pounded and rubbed on the limbs for rheumatism.

Uncaria pteropoda, Miq. (*Rubiaceæ*). A large wild gambir. The leaves are rubbed on the side for pain.

Hedyotis capitellata, L. (*Rubiaceæ*) Akar Sutinbut, *Pctunga venulosa* Roxb. (*Rubiaceæ*), a shrub or small tree, and *Ardisia odontophylla*, Roxb. (*Myrsineæ*) "Pasal". Of these the roots are boiled and used to foment in cases of rheumatism or rubbed on.

And the leaves of *Erigeron canadense,* (*Compositæ*) "Chapu" "Kapugis". A common wayside weed, *Ardisia complanata* (*Myrsineæ*) a shrub and *Sphenodesma barbatum* (*Verbenaceæ*) are used in like cases.

Tinomiscium petiolare, (*Menispermaceæ*) "Lumpaong". The roots of this plant are applied to the limbs in rheumatism.

Selaginella Willdenovii, (*Selaginellaceæ*). "Akar tuylong" (Kelantan.) This is used with the leaves of "Daun Susoh" apparently an *Embelia* near *Limpani,* "Burnboth", mix the ashes with oil and use as a liniment, for pain in the back (Dr. GIMLETTE.)

Piper porphyrophyllus, (Piperaceæ) "Akar Buger". Boil the leaves and rub the body with the watery infusion use for weakness and pains in the bones. (Kelantan, Dr. GIMLETTE.)

Pæderia foetida L. (*Rubiaceæ*) Daun Sekuntot. HOLMES says, Daun keulot-keulot, probably a miscopy for kuntot-kuntot. Leaves employed in the form of an emulsion for flatulence and rheumatism. It is also used as a specific for rheumatism in India.

Datura alba, Wall, and *D. fastuosa* (*Solanaceæ*) "Kechubong." The leaves of these weeds are used as an anodyne for pains in the joints, rheumatism or sprains, being pounded and plastered on the part affected. In a valuable paper on Datura poisoning in the Federated Malay States (British Medical Journal, May 16, 1903). Dr. GIMLETTE says the Malays mix leaves with urine or powdered rice and saffron (*i.e.* turmeric) and apply them externally for various pains and swellings. They will heat them over a torch until smoked and then apply them as a poultice over the spleen in intermittent fever. The root is powdered and applied to the gums in order to relieve the pain of toothache. The flowers are dried and roughly powdered with or without the leaves and rolled into cigarettes for the relief of asthma. The plant is probably the commonest used in criminal poisoning.

Datura—Recipe for a stimulating liniment for aching of the spine, take equal parts of the Daun Kachubong, Bawang merah (red onion) and Haliya (Ginger) pound well and squeeze out the juice use four or five times a day. (Serasa, Kelantan, Dr. GIMLETTE.)

Moringa pterygosperma, L. (*Moringeæ*) "Morungei." The horse-radish tree is used in a favourite rubefacient, which consists of ginger, garlic, mustard, bark of the Morungei, all moistened with vinegar. It is rubbed on the part affected.

Justicia gendarusa, L. (*Acanthaceœ*). Gandarusa is cultivated in all Malay villages, and used for a variety of ailments for which it has a great reputation, but especially for rheumatism and lumbago. The leaves are rubbed up with those of Bakung (*Crinum Asiaticum*) and black pepper and applied to the loins for lumbago.

Zingiber Cassumunaar, Roxb. (*Scitamineœ*) "Bonglei". A common village ginger somewhat aromatic but not as hot as ordinary ginger. A poultice made of the rhizome pounded mixed with spirit or arrack is used as a stimulant and rubefacient in contusions and rheumatic pains (HOLMES).

DROPSY.

This among Malays includes Beri-beri.

Rennellia speciosa, Hook, fil (Rubiaceæ) "Mengkudu Rimbah", "Lempedu Tanah". A small shrub with beautiful violet flowers, not very common. A decoction of the roots is used for dropsy and rheumatism, externally or as a bath externally.

Gmelina villosa, Roxb. (*Verbenaceœ*) Bulangan. The acid fruit rubbed up with lime and garlic and the body rubbed with the mixture is used in dropsy.

Vitis, sp. "Akar Sabunka", prob. *V. cinnamomea.* The root is employed in the form of a decoction as an outward application in oedema of the legs caused by anæmia (HOLMES.)

Moringa pterygosperma, Gaertn. (*Moringeœ*) Morungei. The root is used as a diuretic in dropsy as in India (HOLMES.)

HYDROCELE AND ORCHITIS.

Coesalpinia bonducella (*Leguminosœ*) "Kelichi" is used for hydrocele. The leaves are ground up with salt to form a drink, which is administered, and to the part affected the leaves roasted and put in a cloth are applied hot.

The plant is a very thorny shrub climbing on the sea-shore with yellow flowers and a prickly pod containing two or more round grey seeds.

Pternándra caerulescens, Jack. (*Melastormaceæ*) "Sial Munahun Paya". The fruits are pounded up and applied.

Tabernoemontana corymbosa, Roxb. (*Apocynaceæ*) "Jelutong Badak". The ground up roots of this plant are used in the same way. It is also well known as a drug for venereal disease.

HEAD-ACHE.

A large number of leaves of different kinds are used for applying to the head in cases of head-ache and one can often see natives. They appear to be chiefly those of juicy plants which merely cool the head and so allay the pain somewhat.

Pericampylus incanus, Miers. (*Menispermaceæ*) "Akar Kelempenang.

Jussiena suffruticosa, L. (*Lythraceæ*). A herb, "Bujang Samalam" "Lakom Ayer".

Gynotroches axillaris, Forst. (*Rhizophoraceæ*), Mata Kli.

Quisqualis indica, L. (*Combretaceæ*) climber.

Kalanchoe sp. (*Crassulaceæ*) "Sedingen", Tawas China. A cultivated succulent herb.

Crotalaria verrucosa, L. (*Leguminosae*) Gigiling Jantan.

Acaceá pseudo-intsia (*Leguminosae*) "Akar Kupoh".

Anplectrum glaucum, Triana. (*Melastomaceæ*) "Sendudu kaya". A climber especially recommended for giddiness.

Hedyotis glabra, Roxb. (*Rubiaceæ*) "Rumput Sibueh". A weed.

Spermacoce hispida, L. (*Rubiaceæ*) "Rumput Sumbro".

Curanga amara, Juss. (*Scrophularineæ*) "G'lumak Susu", rubbed up with coriander seed.

Henslowia Lobbiana, Dec. (*Santalaceæ*) "Akar Api-api".

Thespesia populnea, Carr. (*Malvaceæ*) "Baru". Leaves bruised and mixed with the pounded fruit applied externally for headache (HOLMES).

Vitis cinerea Lum, prob. *V. diffusa*, (*Ampelideæ*) "Daun Lakom", The leaves and root are employed as a rubefacient in headache, (HOLMES).

Cleome spinosa (prob. *C. viscosa*) (*Capparideæ*) "Daun Mamong" Bruised leaves for headache (HOLMES).

Viscum monoicum, Roxb. (prob. *V. orientale* (*Loranthaceæ*) "Sri Sabulan". "This mistletoe grows parasitically on Strychnos nuxvonica and is reputed poisonous. The pounded leaves are applied externally to the temples in neuralgia" (HOLMES). *Strychnos nuxvounica* occurs nowhere in the Malay Peninsula.

Cloves and pepper are also used as an application in headache (HOLMES).

Vitex trifolia, (*Verbenaceæ*) Lagundi. Leaves ground with seeds of *Nigella sativa*, "Jintan Hitam" are applied to the head.

Musa Sapientum, L. (*Musaceæ.*) Banana leaves, are used to apply to the head to cool it in headache.

The red pumpkin *Trichosanthes Wallichiana*, Cogn. (*Cucurbitaceæ*) is pounded and put on the head in cases of headache. It is said to be poisonous if taken internally.

Matthea latifolia, Perk. (*Monimiaceæ*) "Churom". The leaves are smoked mixed with tobacco by Jakuns for headache. Nothing is known of the properties of this curious shrub.

Allomorphia exigua, (*Melastomaceæ*) "Poko Kedudoh Gajah" (Kelantan) with Poko Kududok Batu, (specimen not sent). Bruise in cold water and apply to the forehead, use for headache (Dr. GIMLETTE).

Momordica charantia, (*Cucurbitaceæ*) "Daun Prioh" (Kelantan). Pound the fresh leaves and apply to the forehead externally. Drink the juice with water. Use for headache (Dr. GIMLETTE).

INFANTILE DISEASE.

For Thrush:—Adas (Aniseed), Pulasari, the bark of the sweet scented climber *Alyxia stellata* and a red onion (Bawang Merah) are pounded up and put in plantain leaf (*Plantago major*), this is put on the embers and cooked and the juice squeezed out and put on the child's mouth.

Ruellia repens, L. (*Acanthaceæ*) "Dras Malam". A small creeping herb common in hedges is pounded up with rice and turmeric and rubbed over the child's body for heavy perspiration and restlessness at night.

HYSTERIA.

Such ailments as hysteria are supposed to be caused by devils, and treated as such by incantations and other ceremonies, but the "Medang Asam" *Litsea penangiana*, Hook. A common tree is used for the disease known as "Sakena" when any one gets hysterical through a fright. The leaves are pounded and applied to the head and body for a few days.

(*To be continued.*)

GOW, WILSON & STANTON, LIMITED.
India Rubber Market Report.

13, ROOD LANE, LONDON, E. C.
June 22nd, 1906.

At to-day's auction, 278 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which only 92 changed hands in the room. The total weight amounted to about 15¼ tons, Ceylon contributing 3½ and Straits Settlements 11¾.

The market has maintained the quiet tone recently ruling, and orders being scarce, few of the large buyers were inclined to operate to any great extent. As a result competition was restricted, and a large proportion of the offerings had to be retired for lack of support.

Where sales were effected some concession had to be given on last prices, but for the most part sellers preferred to have recourse to the private market.

QUOTATIONS.—Fine Sheet, 5/9 to 5/9½.
Fine biscuits, 5/11.
Fair biscuits, 5/8½.
Crape { Fine pale ribbon, 5/11½.
Darker, 5/2 to 5/4½.
Dark, 3/6 to 4/-.
Scrap { Fine, 4/10 to 5/-.
Medium, 4/6.
Low, 2/2½ to 2/6.

PLANTATION BISCUITS AND SHEET TO-DAY.—5/9 to 5/11, same period last year, 6/5 to 6/7¼.

PLANTATION SCRAP.—4/6 to 5/-, same period last year, 4/3½ to 5/5¾.

FINE HARD PARA (South American).—5/2¼, same period last year, 5/8.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

92 packages at 5/3¼ per lb., against 123 packages at 5/8 per lb. at last auction. Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Kumaradola	3 cases palish biscuits (damp), 5/7½.
Tudugalla	3 cases dark biscuits, 5/8½. 1 case good scrap, 4/3. 1 case loaded scrap, 2/6.
Elston	1 case good dark biscuits, bought in. 1 case good pale scrap, bought in.
M	1 case very fine Ceara biscuits, 5/11. 2 cases little darker, 5/11.
Sunnycroft	2 cases good palish biscuits, bought in.
T R R	1 case good pale to dark biscuits, bought in. 1 case large palish to dark biscuits, bought in.
K M	1 case rough Ceara biscuits, bought in. 1 bag good scrap, bought in.
Doranakande	2 cases good very dark biscuits, bought in. 2 cases fine palish to dark scrap, 5/-. 1 case good dark scrap, bought in.
Dolahena	1 case good dark sheet, bought in. 1 case darkish scrap, bought in.
Baddegama	1 case good palish biscuits, bought in. 1 case fine pressed scrap, bought in. 1 bag good lumps, bought in.
S A M M	1 bag rejected biscuits and scrap, bought in.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
H L K	1 bag scrappy biscuits, bought in.
Bandarapola	1 case fine pale Ceara biscuits, bought in.
Goonambil	1 case darkish sheet and biscuits bought in.
Halwatura	2 cases fine pale scrap, 4/10.
Okanda	1 case loaded scrap, 2/2½. 1 case heated scrap, bought in.
Katugastota	1 case very fine pale scrap 5/-.
Maddagedera	1 case good palish to darkish scrap, 4/11½.
F B	10 cases pale to dark biscuits, part Ceara, bought in. 1 case scrap, bought in. 1 case heated biscuits, bought in.
Marakona	2 cases rough biscuits, bought in.
Clontarf	1 case fine pale to dark biscuits, bought in. 1 case dakrer, bought in.
Kumbukkan	2 cases pale to darkish biscuits, bought in. 2 cases rougher, bought in.
Heatherley	3 cases very fine biscuits, bought in. 2 cases fine darkish pressed crape, bought in.
Ellakande	2 cases fine darkish biscuits, bought in.
Culloden	2 cases dark pressed crape, bought in.

STRAITS SETTLEMENTS

MARK.	QUANTITY DESCRIPTION AND PRICE PER LB.
C M R E Ld.	14 cases fine pale to palish crape, bought in. 2 cases darkish to dark, 5/2.
Sungei Krudda	3 cases fine amber sheet bought in. 1 case good scrap, part heated, bought in. 1 case good thick biscuits, bought in.
L E A	5 cases good palish to darkish sheet, bought in.
L E B	1 case darkish crape, bought in.
B R R Co Ld.	7 cases fine amber sheet, bought in. 5 cases paler, patchy, bought in. 3 cases good scrap, bought in.
D W H S	1 case darkish crape, bought in. 2 cases darker, bought in. 3 cases palished mottled, bought in.
G M S B	4 cases fine amber sheet, bought in. 1 case pressed scrap, bought in.
S	4 cases fine amber sheet, bought in. 3 cases pressed scrap, bought in.
R R S O W	1 case fine sheet, bought in.
V R Co Ld Klang F M S	42 cases fine dark washed scored sheet, 5/9 to 5/9½. 1 case cuttings, bought in. 7 cases fine pressed palished crape, 5/4¼ to 5/4½. 7 cases darkish to dark, 3/6 to 4/-. 2 cases dark soft, 3/6.
L & P F M S K	14 cases fine pale ribbon, 5/11½ bid for part. 2 cases palish streaky, bought in 6 cases darkish, bought in. 3 cases dark, bought in.
S R C Ld.	22 cases fine darkish scored sheet, bought in. 9 cases fine palish to darkish pressed crape, 5/3¼. 1 case soft dark pressed crape bought in.
J E Ld.	2 cases rough biscuits, bought in. 4 cases pressed scrap, part sold 3/6. 1 bag scrappy sheet, bought in.
S R C	15 cases fine darkish scored sheet, bonght in.
Brink	1 case fine amber sheet, bought in.
B C	2 cases fine sheet and biscuits, bought in.
C C	1 case rough sheet and biscuit, bought in.
S C	4 bags scrap, etc., 4/6.

SHIPMENTS OF PLANTATION RUBBER.

EXPORTS FROM COLOMBO AND GALLE FROM 1ST JANUARY TO 28TH MAY.

1906	48 tons.
1905	18 ,,
1904	12½ ,,
1903	8½ ,,

Exports from Singapore 1st January to 15th May, 1906, 72 tons.

REGISTER OF RAINFALL AT NEGRI SEMBILAN HOSPITALS FOR JULY, 1906.

Date.	Seremban.		K. Pilah.		Tampin.		Jelebu.		Port Dickson.		Mantin.	
	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.
1	...	...	...	...	...	...	...	...	...	...	...	...
2	...	11	...	...	...	...	...	25	...	...	...	...
3	...	...	...	...	...	05	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	..	...	...	...	...	08	...	...
6	...	05	...	50	...	20	...	42	...	12	...	...
7	...	...	...	...	...	...	...	10	...	...	...	04
8	...	28	...	...	...	...	...	02	...	...	...	...
9	...	10	...	25	...	...	...	85	...	...	...	68
10	...	06	...	20	...	60	...	42	1	71	...	70
11	...	...	...	03	...	08	...	...	1	41	...	75
12	...	...	...	...	...	...	...	...	...	...	...	...
13	...	...	...	...	...	35	...	...	...	47	...	10
14	...	56	...	..	...	75	...	...	..	74	...	12
15	...	...	...	...	...	...	...	...	...	...	...	...
16	...	...	...	...	...	20	...	...	1	40	...	...
17	...	...	...	47	...	10	..	...	...	...	...	...
18	...	..	...	...	...	...	...	...	...	...	...	...
19	...	..	...	...	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	...	...	...	...	...
21	...	46	...	...	...	20	...	...	...	34	...	...
22	...	...	...	...	...	...	...	...	...	...	...	...
23	...	67	...	86	...	95	...	...	...	...	...	31
24	..	04	...	...	...	...	...	...	...	...	...	...
25	...	...	...	17	...	...	...	...	...	...	...	...
26	1	55	...	80	...	45	...	37	3	92	...	85
27	...	...	...	...	...	...	...	...	...	...	...	...
28	...	...	...	...	...	...	...	...	...	...	...	..
29	...	...	...	...	...	10	...	...	...	...	...	...
30	...	07	...	03	...	05	...	...	...	24	...	12
31	...	35	...	...	...	...	...	...	...	34	...	07
Total	4	30	3	31	4	08	2	43	10	77	3	74

State Surgeon's Office,
Seremban, 11*th August*, 1906.

R. VAN GEYZEL,
Apothecary.

METEOROLOGICAL OBSERVATIONS.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the Month of July, 1906.

Date.	Temperature of Radiation.										Wind.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Clouds and weather Initials.			Rain.
											Direction.																	
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun	Difference sun and shade.	Grass.	Difference shade and radiation.	9 H	15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	21 H	9 H	15 H	21 H	Inches.
	°	°	°	°	°	°	°	°	°	°			°	°	°	in.	in.	in.	°	°	°							
1	76	85	80·5	86	71	15	119	33	69	2	S.E.	S.E.	74·3	72·8	73·5	0·848	0·808	0·828	94	64	79	3	0	0	C	B	B	
2	80	84	82	84	71	13	139	55	70	1	S.E.	S.E.	75·	75·7	75·3	·867	·888	·877	85	76	80·5	2	3	2	B	C	B	·11
3	79	86	82·5	86	74	12	134	48	70	4	S.E.	S E.	73·9	74·	73·9	·839	·855	·847	5	68	76·5	2	0	0	B	B	B	
4	78	85	81·5	85	74	11	140	55	69	5	S.E.	S.	74·6	73·4	74·	·857	·826	·841	89	68	78·5	2	0	0	B	B	B	
5	81	87	84	87	74	13	137	50	69	5	S.E.	S.	72·	72·2	72·1	·802	·792	·797	76	61	68·5	2	0	0	B	B	B	
6	81	85	83	86	74	12	134	48	69	5	E.	S.E.	74·	73·4	73·7	·849	·826	·837	80	68	74	2	3	0	B	C	B	·05
7	82	88	85	89	74	15	145	56	70	4	E.	E.	78·7	73·3	76·	·978	·819	·898	90	61	75·5	0	0	3	B	B	C	
8	80	80	80	81	73	8	132	51	72	1	S.E.	S.E.	73·3	73·3	73·3	·820	·820	·820	80	80	80	2	5	5	B	C	C	·28
9	81	86	83·5	86	71	15	143	57	70	1	S.E.	S.E.	72·	72·8	72·4	·802	·808	·805	76	64	70	2	10	10	B	R	R	·10
10	80	81	80·5	83	71	12	109	26	70	1	E.	S.E.	73·3	74·	73·6	·820	·849	·834	80	80	80	3	10	10	C	R	R	·06
11	79	85	82	85	71	14	139	54	69	2	S.E.	S.	73·9	73·4	73·6	839	·826	·832	85	68	76·5	3	0	0	C	B	B	
12	77	81	79	82	73	9	128	46	70	3	E.	S.E.	71·9	74·	72·9	·783	·849	·816	84	80	82	5	5	3	C	C	C	
13	78	85	81·5	86	72	14	141	55	70	2	S.E.	S.E.	74·6	73·4	74·	·857	·826	·841	89	68	78·5	3	5	0	C	C	B	
14	76	84	80	85	72	13	137	52	70	2	S.E.	S.	72·6	72·4	72·5	·801	·794	·797	89	68	78·5	3	2	5	C	B	C	·56
15	74	85	79·5	85	71	14	132	47	69	2	E.	S.E.	72·3	73·4	72·8	·793	·826	·809	94	68	81	5	2	0	C	B	B	
16	77	84	80·5	84	71	13	140	56	70	1	S.E.	S.E.	75·3	72·4	73·8	·877	·794	·835	94	68	81	3	2	0	C	B	B	
17	80	82	81	83	71	12	136	53	70	1	S.	S.	73·3	73·6	73·4	·820	·830	·825	80	76	78	3	3	0	C	C	B	
18	81	86	83·5	86	71	15	142	56	70	1	S.E.	S.	72·	71·2	71·6	·802	·763	.782	76	61	68·5	2	3	2	B	C	B	
19	81	88	84·5	88	71	17	143	55	70	1	S.E.	S.E.	76·	71·6	73·8	·897	·775	·836	85	58	71·5	2	0	0	B	B	B	
20	82	87	84·5	88	72	16	141	53	69	3	S.	S.	73·6	70·6	72·1	·830	·749	·789	76	58	67	0	0	0	B	B	B	
21	79	84	81·5	85	72	13	124	39	69	3	S.E.	S.E.	73·9	74·4	73·1	·839	·794	·816	85	68	76·5	3	3	3	C	C	C	·46
22	80	84	82	85	72	13	128	43	69	3	S.E.	S.E.	75·	72·4	73·7	·867	·794	·830	85	68	76·5	2	3	3	B	C	C	
23	79	80	79·5	80	72	8	125	45	70	2	S.E,	S.E.	75·6	73·3	74·4	·888	·820	·854	90	80	85	3	10	5	C	R	C	·67
24	81	88	84·5	89	70	19	144	55	69	1	S.E.	S.E.	75·3	74·9	75·1	·877	·865	·871	80	65	72·5	2	5	0	B	C	B	·04
25	80	85	82·5	86	70	16	137	51	69	1	S.E.	S.E.	75·	76·7	75·8	·867	·922	·894	85	76	80·5	2	0	3	B	B	C	
26	75	80	77·5	82	70	12	135	53	69	1	S.E.	E.	73·3	73·3	73·3	·820	·820	·820	94	80	87	10	3	2	R	C	B	1·55
27	75	81	78	82	70	12	142	60	68	2	E.	S.E.	73·3	74·	73·6	·820	·849	·834	94	80	87	5	5	0	C	C	B	
28	81	89	85	90	70	20	142	52	69	1	S.E.	S.E.	74·	67·8	70·9	·849	·677	·763	80	49	64·5	2	5	0	B	C	B	
29	81	88	82	89	69	20	143	54	67	2	S.E.	S.E.	74·	74·9	74·4	·849	·865	.857	80	65	72·5	0	0	0	B	B	B	
30	82	84	83	85	69	16	141	56	66	3	S E.	S E.	75·3	72·4	73·8	·877	·794	·835	80	68	74	0	0	0	B	B	B	·07
31	79	81	80	84	69	15	140	56	67	2	S.E.	E.	73·9	74·	73·9	·839	·849	·844	85	80	82·5	10	3	0	R	C	B	·35

Total 4·30

State Surgeon's Office,
Seremban, *8th August*, 1906.

R. VAN GEYZEL,
Apothecary.

AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

No. 8.] AUGUST, 1906. [Vol. VIII

BANANA FIBRE.

REPORT ON THE FIBRES OF *Musa malaccensis* AND *Musa sapientum* FROM THE STRAITS SETTLEMENTS, BY PROFESSOR WYNDHAM R. DUNSTAN, M.A., F.R.S., DIRECTOR, IMPERIAL INSTITUTE, SOUTH KENSINGTON, LONDON.

The samples of these fibres which are the subject of the present report were forwarded to the Imperial Institute by the Director of the Botanic Gardens at Singapore, with a letter dated April 23, 1906.

It was stated that the wild plantain, *Musa malaccensis*, is very abundant in the Straits Settlements and could be grown as a catch-crop with rubber if the fibre proved to be of value.

The other fibre was obtained from a cultivated banana, *Musa sapientum*, of the common edible variety known as "Rastali."

The samples of fibre were prepared by Mr. A. D. MACHADO, of Kamuning Estate, Perak, who has invented a scutching machine for the extraction of the fibre.

DESCRIPTION OF SAMPLES.

The samples obtained from *Musa sapientum*, var Rastali consisted of 1½ ounces of rather coarse and imperfectly cleaned fibre, light buff in colour and of very poor strength. The average length was 5 feet 6 inches but some of the fibre was as much as 7 feet in length.

The sample from *Musa malaccensis*, the "Wild Pisang," consisted of one ounce of very weak fibre averaging 6 feet 7 inches in length, some of the fibre being 9 feet long. It was inferior to the other fibre in appearance, and was also coarser owing to the fact that the fibres has not been separated.

The coarseness and weakness of the fibres are most likely due to imperfect cleaning and preparation. The samples were too small for complete chemical examination, and owing to their condition the results would not have been representative of the behaviour and composition of the carefully prepared fibres.

COMMERCIAL VALUATION.

The samples were submitted to commercial experts, who reported that the *Musa sapientum* fibre was a well-grown fibre of good length but totally lacking in strength, which is the most important quality required in fibre for rope-making. At the present time, in view of the high prices ruling for fibres, it was valued at £28 per ton.

The fibre of *Musa malaccensis* was described as a well-grown fibre of satisfactory colour but much drier and more brittle than Manila hemp. The value was estimated at about £35 per ton, but if the fibre were of greater strength the value would be £6 to £7 per ton more.

CONCLUSION AND RECOMMENDATIONS.

These fibres appear to be well grown but not very satisfactorily prepared. The fibre from the wild plant, *Musa malaccensis,* appear to be the more promising.

If greater care were taken in the extraction process, so as to obtain properly separated fibres of greater strength, there is little doubt that the products would meet with a satisfactory sale.

(Sd.) WYNDHAM R. DUNSTAN.

July 10, 1906.

NOTES ON THE ABOVE.

This paper will be read with interest by all who have turned their attention to the Malay Peninsula as a fibre producing country. The increased and excellent exhibits of fibres at the recent Agricultural Exhibition show that some at least have their attention called to this industry. Banana fibre has not rarely been prepared in various parts of the world, and on previous occasions both of our wild plantains have been under experiment. Of these there are two common species and one rare one, *Musa malaccensis* is practically a weed in fresh cleared jungle. On the slopes of the Hermitage Hill in Perak, many years ago, I found that a large area of forest had been felled with the result that *Musa malaccensis* had sprung up like grass, one could hardly get through it. Here was wasting perhaps hundreds of tons of fibre valued at the worst at £35 per ton. The plant is common and conspicuous all over Selangor and Perak, in damp more or less cleared forest. Round Kuala Lumpur it abounds, and can be seen from the railway. *M. malaccensis* is easily distinguished from the other wild one *Musa violascens* by its glaucous foliage and purple-brown bracts, *M. violascens* has violet bracts, the colour of a brinjal, and an erect spike. It is more slender and has plain green leaves. This latter, not so extremely common as the *M. malaccensis*, has not yet had a really fair trial as a fibre plant, and may prove better.

Careful preparation of the fibre from stems before flowering should give a good return, and considering that the only cultivation required is to clear away the scrub round the plant and let it grow, there seems no reason why this source of profit should be neglected.

Mr. MACHADO'S samples were small but he showed a finer cleaner lot in his excellent collection of fibres at the late exhibition, where he easily carried off first prize. Readers will note in Professor DUNSTAN'S report the allusion to the high price of fibres just now. There is, in fact, a very large demand for fibres of all kinds, and this is more likely to increase as years go on than to decrease. Some, and this includes bananas, might well be grown as catch crops in rubber. Again, this is work in which the natives might well be employed. The Malays would be encouraged to bring in some of the wild fibres of which our forests contain many if there was a buyer for them, stationed at some such place as Kuala Lumpur. This suggestion was made some years ago in the Bulletin apropos of Kabong fibre, for which there was a considerable demand in tons, but it is one of those fibres only collected in small lots by Malays, and what was wanted was a fibre buyer who would take small lots in the districts and accumulate them into sufficient bulk to be saleable in Liverpool, or Hamburg. As it is a great deal of the forest wealth lies ungathered for want of some such system.

REPORT ON A SPECIMEN OF BENZOIN FROM THE FEDERATED MALAY STATES

BY

PROFESSOR WYNDHAM R. DUNSTAN, M.A., F.R.S., DIRECTOR,
IMPERIAL INSTITUTE, SOUTH KENSINGTON, LONDON.

This sample of benzoin was sent to the Imperial Institute, by the Curator of the Selangor State Museum, Kuala Lumpur, and is referred to in his letter No. 87/05, dated November 24, 1905. It was stated that the product was derived from a species of *Styrax* which is fairly common in the neighbourhood of Kuala Lumpur, and that considerable quantities might be forthcoming if the value of resin were sufficient to make its collection remunerative.

DESCRIPTION OF SAMPLE.

The sample, which weighed 14 oz., consisted of a single, roughly-ovoid lump of brown resin, which had the characteristic odour of benzoin.

CHEMICAL EXAMINATION.

Chemical examination established the identity of the resin with benzoin and showed that it most resembled the variety of this product known commercially as Palembang benzoin. It contained 1.61 per cent. of moisture, 0.41 per cent. of ash, and 91.48 per cent. of resin soluble in alcohol.

CONCLUSIONS.

Material represented by the present sample could be used instead of Palembang benzoin for all purposes to which the latter is applied.

The benzoins official in the British Pharmacopœia are the Siam and Sumatra varieties, which are derived from *styrax benzoin*. The application of the Palembang and other varieties is therefore limited to the preparation of incense and the manufacture of benzoic acid, the latter being the more important use.

The commercial value of this benzoin from the Federated Malay States would be about the same as that of Palembang benzoin. The latter was quoted in London on February 24, 1906, at £2 8*s*. to £2 10*s*. per cwt. for ordinary quality, whilst a consignment of good quality was sold at £3 8*s*. per cwt. on the 2nd March last. The present sample would probably sell as ordinary quality.

If these prices will render the collection of the resin remunerative, the Imperial Institute will be glad to assist in finding a market for the product.

(Sd.) WYNDHAM R. DUNSTAN.

April 24, 1906.

NOTE ON THE ABOVE.

The plant which produced the Benzoin above described is probably *Styrax Benzoin* which is abundunt in Kuala Lumpur as in other parts of the Peninsula. It is a big tree with bright green leaves backed with white, and panicles of very fragrant white flowers. As it often flowers when quite small, 12 to 15 feet tall, it is quite worthy of cultivation for its beauty and fragrance. Benzoin is known here as Kemeniyan, but seems rarely to be collected in the Peninsula. To obtain it the bark, which has no odour of the incense, is cut about with a parang or knife, and after about a fortnight the exuded resin is collected. It does not exude at first, nor indeed for a week or two. The plant is cultivated in Palembang, and an account of its cultivation, unfortunately in Dutch is reprinted in Dr. GRESHOFF'S "Nultige Pflanzen" XXVIII, from L. M. Vonck (Tijdschr, v. Nijverheid afd. Kolonial Museum, 1891).

There are two other species of Styrax in the Peninsula, viz., *S. Crotonoides*, a rare plant here occurring also in Sumatra, and *S. serrulatum* in Penang, India and China.

It appears from Dr. GRESHOFF'S paper that *S. Benzoin* is the source of the Palembang Gumbenjamin, or Benzoin, but what plant produces that of Siam is not known. Many years ago there was a plant of the Siamese Styrax in the Garden of Dr. Jamie in the Serangoon Road, of which I have a single leaf, sent me by Mr. HOLMES of the Pharmaceutical Society. This garden has been destroyed and with it has gone the tree. The Siamese Gumbenjamin is a native of Laos, and is not easy to procure specimens of. Pierre *Fl. Cochinchinensis* gives a figure of a Styrax brought from Laos, which he says he cannot differentiate from *S. Benzoin.* It is not, I think, that species, but more resembles *S. crotonoides.* Though I have frequently tried to get people visiting that district to procure specimens of this plant, I have failed to get any, so that the origin of the Siamese Benzoin remains doubtful to this day.—H. N. R.

PANDAN HATS.

In the annual report for the coast districts of Negri Sembilan, Mr. ELLERTON says that the Malay industries are continuing actively under the care of a local committee. Hats made of Pandan and Mengkuang are still the most important feature, and probably quite 5,000 of these hats were manufactured and sold in 1905, and it is possible that orders may shortly be received from Europe. Five-hundred hats destined it is said for the Paris markets have already been supplied. One unlooked for result of the success of this industry is the increased number of young Malays to be found hanging about the villages where hats are made supported in apparent comfort by the proceeds of the sale of hats made by their women kind.—H. N. R.

PARA RUBBER AT KUALA KANGSAR.

In the annual report Mr. CAMPBELL writes:—All the *Hevea Braziliensis* were tapped and as a result 664 lb. sheet and 63 ℔ scrap were sent to London for sale. The former realized 6/1½ and the latter 5/0¾ per ℔. The loss in weight was 1.97 per cent. The rubber was exported as "fine palish and dark sheet rather dull." The sheets were from $\frac{1}{16}$ to $\frac{1}{8}$ inch thick. The London brokers advised that in their opinion the rubber would be more saleable if the sheets were rather thick.

The demand for *Ficus elastica* is not very general. In a few isolated cases orders have been received for plants but in most seeds are preferred. Some tapping of Rambong was done in July and some interesting experiments were carried out in making sheets similar in size, thickness, etc., to those of Para. Some good sheets were made of a reddish-brown colour and were exhibited at the Penang show. A few trees of Castilloa elastica were tapped for specimens for the Agricultural Show. The rubber turned out was of fair quality and was prepared in two forms latex coagulated as taken from the trees, and latex washed before coagulation. The rubber coagulated as taken from the tree was almost black in colour and rather sticky. That washed was a dirty white and much less sticky. The elasticity of both samples appeared to be about the same. The tapping was done by both herring-bone and spiral methods.

Ceara (*Manihot Glaziovii*). Some trees of this rubber, were also tapped for the show. The flow of latex was not large but the rubber turned out, which somewhat resembles Para, was excellent in quality, being pronounced by a Ceara expert as quite as good a sample as he had ever seen. The trees tapped were about 15 years old.

On this Mr. BIRCH writes:—To those interested in the future of the Malay race it is a matter of satisfaction that rubber culture has came to stay, for the art of tapping appeals to the Malay. He is very neat with his knife; to sit in the shade and earn a good wage will exactly suit his temperament. As every acre will give work for one man we may hope to see, ere long, thousand of Malays congenially employed.

NOTE ON THE METHOD OF PREPARING DRAGON'S BLOOD.

A Perak Malay having brought to the Exhibition a complete series of articles showing the method of preparing dragon's blood, I took the opportunity of eliciting from him the method of preparation of this product, and obtained the complete set of the articles illustrating the subject. He had brought a living plant, and a portion of a stem and infrutescence of the rattan which proved to be *Dœmonorops propinquus Griff*, and a number of fruits of the same plant. With these were a quantity of cockle shells, and a small bottle-shaped basket of strips of pandan leaves hung by a string from a tripod of bamboo sticks. He explained that the dry fruits are put into the basket with some of the cockle shells and the basket then shaken, as it hangs from the bamboo sticks, over a cloth. The resin on the shells of the fruit is knocked off by the cockle shells and falls as a fine powder through the interstices of the basket on the cloth. It is pounded up to make it evenly fine, and when made into cakes is put in a cloth and steeped in warm water and then the cloth is squeezed till the dragon's blood makes the firm hard block which is exported.

H. N. RIDLEY.

FEDERATED MALAY STATES. DEPARTMENT OF AGRICULTURE.

ANNUAL REPORT OF THE INSPECTOR OF COCONUT PLANTATIONS FOR THE YEAR 1905.

The area under coconuts at the end of 1905 in the Federated Malay States may be estimated approximately at 100,000 acres, apportioned to the four States as follows :

Perak	50,700 acres
Selangor	18,800 ,,
Negri Sembilan	16,000 ,,
Pahang	14,500 ,,

On more than half of this acreage the trees are in bearing, and its value in my opinion may be estimated at about 17,000,000 dollars.

INCREASE, 1905.—After deducting some 700 to 800 acres of coconuts (planted originally among the rubber in some European estates in Selangor and Perak, which were destroyed to make room for the latter in 1905), there still remains the substantial increase of 10,000 acres in the cultivation as compared to the preceding year. This, I think, may be considered quite satisfactory, seeing that the extension is almost entirely confined to native holdings and indicates that the cultivation of the coconut, which is particularly suited to their wants, continues to find favour among them. I anticipate every probability of as much, if not more, land being opened up during the current year.

THE STATE OF PERAK contributes chiefly towards the area planted up during 1905, Bagan Dato, Runkup and Utan Melintang, in Lower Perak, accounting alone for no less than 5,000 acres. These mukims, as I have mentioned before, contain by far the finest contiguous block of coconuts in the States, and although many of the trees are still young the greater number are in bearing. In fact, the district has, during the year under review, made immense strides and the output of copra was nearly double that of the previous year. I was therefore very pleased to learn that the Government has this year made provision for commencing the proposed circular road from Utan Melintank to

Bagan Dato, also for improving the bridle paths and setting up some more sluice gates for the better draining of the land.

Quite a large area will be opened up by the road in question and made available for agricultural purposes; the land being equally suitable for either coconuts or rubber cultivation. I feel sure the proposed works when completed will add very materially to the welfare of this prosperous district.

At Likir, also in Lower Perak, on the other side of the Perak river, I anticipate a considerable acreage of land being opened up in coconuts during 1906. This mukim is held in great favour by the natives, and perhaps naturally so, as it is by no means uncommon to find many trees in their kampongs with as much as 200 nuts or more on them.

In the Krian district the increase of 1,700 acres planted up in 1905 is also satisfactory. The land is well suited for coconuts and no doubt a considerable area will be planted up during the current year.

Everything in the Matang and Larut districts points to a further increase in the cultivation. The Kinta and Kuala Kangsar districts also show prospects of a fair area being planted up in coconuts during 1906.

THE STATE OF SELANGOR.—The Europeans are not likely to do very much in the way of extension with coconuts, owing to rubber being so much preferred. The present bright prospects of the latter product are for the time throwing everything else into the shade. It is, however, satisfactory to note that the native holdings of coconuts both at Morib and in Kuala Selangor have increased, and I expect to see continued development in these districts. In Morib over 1,000 acres were planted out by natives during 1905, and in Kuala Selangor (including Bernam) 420 acres.

NEGRI SEMBILAN AND PAHANG STATES.—Although there was not much land planted up in either of the States during 1905, there seems to be some likelihood of further extension in the near future; and with regard to Pahang this especially refers to the Kuantan district.

FINES.—It was found necessary to issue a very large number of notices and from the prosecutions thereunder the fines imposed amounted to $1,600, slight decrease on the year previous.

BEETLE PESTS.—The beetles, on the whole, have been well kept under and some further advance has been made in eradicating the pests. At the same time, there are still a few localities remaining where considerable trouble is met with. No really serious harm has so far resulted from the ravages, this may be attributed to the constant and energetic steps that have been taken for their destruction.

Pudu, Ampang, Race Course, Batu Road, in Kuala Lumpur, and Rawang in Ulu Selangor, are some mukims where the beetles are most difficult to thoroughly eradicate. Again, there are a few coconut trees scattered among the mining lands which are much neglected and prove a continual source of danger.

Considerable progress has been made in Klang, but here also in several small native holdings the beetles are very difficult to thoroughly stamp out.

Generally, the beetles have given considerable trouble in the Jeram, Bukit Rotan and Kuala Selangor districts, and I am not satisfied with the progress that has been made in these districts, owing to the services of the Sanitary Inspector, kindly lent me by the District Officer, being insufficient to carry out properly the work and supervision required over so large an area. Now, however, that provision has been made in 1906 estimates for a Sub-Inspector for Kuala Selangor and Bernam, I anticipate I shall not only be able to cope more effectually in preventing the ravages of the beetles, but also bring about before the end of the year considerable improvement in the general condition of the extensive native holdings.

I am glad to state that in Perak and Negri Sembilan the pest has been practically eradicated. It is true that the beetles are continually making their appearance in small quantities in several of the mukims; but the supervision prevents them making further headway or harming the trees to any appreciable extent.

The beetles in Pahang are being rapidly stamped out. The most serious trouble here comes from the plantations belonging to the Sultan, where many of the trees are still suffering from their attacks.

OTHER DISEASES.—The only State where I found any trouble from other diseases was in Pahang, at Pekan, and some of the adjacent mukims. The tree appears to dry up completely, commencing from the top, as if struck by lightning. The fronds and leaves first fall away and the tree gradually dies. I went thoroughly into the matter on my last visit to Pekan in September. I had two trees cut down and carefully examined, but could discover nothing to account for the disease. The very older trees seem to suffer the worst, but still some healthy ones in good bearing have also fallen victims to the disease. On the other hand, the younger trees, at least for the present, appear to be quite free from its effects. Perhaps it has something to do with the soil getting caked and hard. In a coconut plantation at Pulau Keladi, where twelve trees suddenly died off in the way recorded above, the owner at once had them cut down and destroyed; the whole of the land was then ploughed over with the result that no other trees have since been attacked, and all the other trees in the kampong are now looking particularly well and healthy. I trust therefore that with more attention and better cultivation being given to the trees the disease may gradually disappear. With this object in view I have arranged for some experiments to be carried out.

General Cultivation.—Very marked progress has been made throughout the States generally in the condition of the native holdings, which has only come about after considerable up-hill work, as those who have had any experience of the usual Malay habits will readily recognise. It must be remembered that the powers that are given me under the Coconut Enactment do not really help me very much in this respect. My Sub-Inspectors have done their utmost by encouragement and persuasive measures towards bringing about this improvement and there is no doubt that the influence of the Penghulus of the districts has also had a very beneficial effect. While I am therefore indebted to many of them for the interest they have taken and the assistance they have afforded me, there are other Penghulus—generally having neglected plantations of their own—who are very indifferent and seem to stand out against any reform. There is no doubt that, owing to the general improvement, better crops have been obtained from the trees, and it is gratifying to me to be able to state that several owners now seem to take a keen interest in their holdings. From this I am inclined to infer that they are at least beginning to understand the advantage gained by more assiduous cultivation. On my last visit to Kuala Pilah the Sub-Inspector of Coconuts in that district informed me that since the natives have given more care and attention to their kampongs and taken a greater interest in them than formerly, he did not require to use the same pressure to enforce them starting to work on their padi lands in good time to assure the chances of a fair crop as was previously the case; and that they are not so callous and indifferent as formerly.

Advantage is now being taken by many owners to plant up the vacant places so often seen in their kampongs, mostly where the trees have either died from old age or been destroyed. To guard against a recurrence of this, many of them have been induced to supply young plants where the coconuts are very old or have given up bearing.

Market.—The price of coconuts has been very well maintained throughout the year. In districts where the trees are plentiful, in good bearing, and over a large acreage, the price has hardly ever fallen below 2 cents and is more often 3 to 4 cents. The lowest of these figures gives quite a good return on the outlay. Again, in districts where there are fewer plantations or the plantations are situated within easy distance of the larger towns, the nuts generally fetch from 5 to 6 cents on an average; while in places where the cultivation is small they can be sold at from 7 to 10 cents a piece, and in certain seasons even higher prices than these are not uncommon. These figures demonstrate pretty clearly that the cultivation of coconuts is a sound and profitable concern for the native community.

Copra and Oil.—I estimate approximately that at least 30,000 pikuls of copra have been exported from the States, in addition to which 12,657 pikuls of copra were purchased by the Selangor Oil Mills Company situated at Kuala Selangor. This makes the out-turn of copra during 1905 nearly double that in 1904, and of course during the current year the exports should show a very considerable increase again. The principal exports of copra were from Telok Anson, Perak, over 23,000 pikuls, from Kuala Selangor 4,900 pikuls, and from Klang, Jugra, 1,800 pikuls. The Selangor Oil Mills turned out from their factory about 6,000 pikuls of coconut oil.

The Agri-Horticultural Show held in Penang proved in every way quite a success. The Colony and the Federated Malay States were well represented by excellent collections of coconuts, both in specimen and variety, also samples of copra, coconut oil and sugar, coir, fibre, etc., and it may be said to the credit of the exhibitors from the States that they carried off, notwithstanding the keen competition, several prizes in this particular section.

The favourable expectations expressed in my last report with regard to the further eradication of the beetle pest and the improvement in and the development of coconut cultivation among the natives, during the year under review, have been fairly realised. In my opinion also, the prospects of the future extension of this valuable industry in the States, so conducive to the welfare and prosperity of a very large portion of the populace, are as promising as ever.

L. C. BROWN,

Inspector of Coconut Plantations, F.M.S.

MALAYAN DRUGS—*continued.*

Applications for Ulcers and Sores in the Legs.

Malays, like other natives of half civilized countries, are very fond of dressing wounds and sores to which they are very liable with pounded or ground-up leaves of various kinds and in many cases the native doctor converts by his skill a wound which with a simple water-dressing would heal in a few days into a serious ulcerated sore.

I have an extensive list of leaves used for healing wounds. Most of them are common weeds, with apparently no definite virtues, but are more or less juicy and keep the wound cool and prevent dirt from getting in. One is, however, a well known medicinal plant which in early English Pharmacopæias was recommended and generally used, that is wormwood (*Artemisia vulgaris*) (*Compositæ*) known here as Heeiya, and introduced by the Chinese and cultivated in medicinal gardens. The form cultivated here is much smaller than the European plant.

The following is a list of herbs used for this purpose:—

Gracilaria lichenoides Ag. (*Algæ*).—The Agar Agar is used for poulticing swollen knee joints and unhealthy sores.

Sida retusa (*Malvaceae*) common weed.

Wedelia biflora Dec (*Compositæ*) Serunei Laut. Seashore herb with yellow heads of flowers.

Emilia sonchifolia Dec (*Compositæ*) Tetumbak Merah. Herb with succulent leaves and pink flowers.

Deutella repens Forst. "Bunga Karang" *Oldenlandia corymbosa L.* "Tulang Belangkas" Rumput siku, or siku-siku. *Spermaccce hispida* L. "Rumput Sulawa,' *Ophiorrhiza Mungos* L. Kudunak. All rubiaceous plants, mostly roadside weeds.

Limnophila pulcherrima "Bremi"; *Torenia polygonoides; Striga lutea* Lour. "Rumput Siku Siku" *Vandellia crustacea* Beuth, "Kera Nasi," all belonging to the order *Scrophularineae* and common weeds.

Ruellia repeus L., "Kurunak" and *Ebermaiera setigera* Nees (*Acanthaceae*). The latter is especially used for sore mouths the leaves being chewed with betel. It is a small forest herb.

Loranthus pentandrus, Miq. (*Loranthaceæ*) "Sanalu Api," one of the mistletoes.

Pouzolzia pentandra L. (*Urticaceæ*), a common weed.

Pterocarpus indicus L. (*Leguminosæ*). Angsana. The juice of the root is used as an application to syphilitic sores (Holmes). The bark of *Pterocarpus indicus* when cut exudes a dark red resin very astringent.

Sesamum indicum L. (*Pedaliaceæ*) Bijan. The oil is used for dressing wounds; I have also seen the seeds themselves used in a lacerated wound of the hand with evil results.

Abutilon indicum Sweet (*Malvaceæ*). Mixed with rice as a poultice it is used to clean ulcers (Holmes).

Nothopanax cochleatum Miq. (*Araliaceæ*). "Daun Mangkok." Leaves used for dressing ulcers (Holmes).

Erythrina indica L. (*Leguminosæ*) Dadup. The leaves pounded with saffron (turmeric) are employed as a poultice for obstinate sores (Holmes). *E. indica* is rare here. *E. stricta* is the common species.

Melodorum fulgens L. (*Anonaceæ*). "Akar Kep." A big jungle climber.

Petunga venulosa (*Rubiaceæ*). "Umpaong putih." A tree or shrub the ground roots of which are used.

Physalis minima L. (*Solanaceae*). "Chipluan" (Javanese) the Ubat Pekong, the leaves of this plant are roasted and mixed with oil for ulcers (Pekong).

Turmeric is commonly used with these powdered leaves in poulticing the sores.

Smilax glyciphylla Sm. is given by Holmes under the name of "Akar restong" the tubers of which are said by him to be used in syphilitic ulcers (perhaps *Smilax China* is intended, a drug very commonly sold in the shops for venereal disease).

POULTICING FOR BOILS OR ABSCESSES.

There are a number of leaves used for this purpose, one of the most popular is *Sida rhombifolia* (*Malvaceæ*) "Seliguri" Sapu Laman. A common weed shrublet with yellow flowers abundant in waste ground. The leaves are pounded and applied to boils to promote ripening.

Desmodium heterophyllum Benth (*Leguminosæ*) "Rumput Sisik Naga," "Rumput Telinga Tikus." This little creeping vetch common in grass is used for poulticing boils, etc., and also dropped in the ear for earache.

Trichosanthes cuspidata Lam. (*Cucurbitaceæ*) "Akar Sunto." A wild climbing pumpkin, the leaves are used for poulticing boils.

Aralidium Pinnatifidum (*Araliaceæ*). The leaves of this tree used in the same way.

Ageratum conyzoides L. (*Compositæ*) Selasik Dani. This very common weed with blue or white flowers is used for abscesses. The leaves are burnt to ashes which are mixed with oil and applied hot.

Hibiscus rosa-sinensis L. (*Malvaceæ*). "Bunga rayah"; Shoe-flower. The leaf is ground up with coconut sugar and the boil poulticed with it. The root of the white-flowered variety is also used ground and applied for carbuncles and a decoction of it drunk.

Portulaca quadrifida (*Portulacaceæ*). A common yellow-flowered weed in paths is used for poulticing.

Corchorus capsularis (*Tiliaceæ*). A yellow-flowered shrubby weed occurring in waste ground one of the jute plants; is also used.

Coscinium Blumeanum (*Menispermaceæ*). A big climber. The roots rubbed up with water are used for sores.

Globba perakensis (*Scitamineæ*). "Matang." Bruise the green leaves make into a pellet with Sirih Juice (*Piper Betel*) and apply. Used to heal the wounds made in piercing the ears (Kelantan, Dr. Gimlette).

Prismatomeris albidiflora. (*Rubiaceae*). "Kayu Sepedili," a shrub or small tree with white flowers, and *Randia Fasciculata ?* (Rubiaceæ) Akar Mukeling (specimen too incomplete). Bruise the leaves and make a poultice for fresh wounds (Kelantan, Dr. Gimlette).

Sonerila apparently undescribed. (*Melastomaceæ*) "Akar Batu." Bruise the leaves and make a poultice of them, for boils (Kelantan, Dr. Gimlette).

Urophyllum sp ? (*Rubiacæ*). "Poko Berklang." Triturate and mix with lime, and Kapar Sirih, for wounds of any kind (Kelantan, Dr. Gimlette). This specimen is unidentifiable and may possibly be identical with the Akar Mukeling mentioned above.

Plumbago rosea L. (*Plumbagineæ*). "Cheraka Merah." This commonly cultivated plant is very acrid and the juice of its leaves and roots mixed with oil, or alone is used as an application for rheumatism and paralysis, for bubos and other glandular swellings, and also for leprosy. An Indian affected with what appeared to be leprosy on the hands used to purchase at the gardens bunches of this plant to apply to the diseased parts and informed me he derived much benefit from it. Holmes states it is allied to Mezereon in its action and probably owes its effects to the acrid principle plumbagin which has been found in *P. europœa. P. zeylanica* L. the wild white flowered form which occurs along roadsides, is also used, but not considered so strong. Besides its use externally it is well-known in the East as a drug for procuring abortion.

Lawsonia inermis.—Henna, Inai. The root is ground up and rubbed in on the head for boils in children.

Akar Ketuil is used in the same way for the same purpose.

TOOTHACHE.

For this the gums are rubbed with the boiled leaves and roots, or the flower heads may be used, of the toothache plant, *Spilanthes Acmella* L. (*Compositæ*) a small weed with heads of yellow flowers known as "Krabo" and "Gulang." It is pungent and acts as a counter-irritant. A well-known native remedy over most of the world. The plant is often sold in the shops.

Sphaeranthus Indicus L. (*Compositæ*), a somewhat similar plant is used in the same way with the addition of pounded Coriander seed; and *Eclipta alba* of the same order with white flowers is also used.

Leaves of *Grmelina Asiatica* (*Verbenaceæ*) "Bulangan" are also rubbed on the gums.

Holmes states also that the leaves of *Bidens pilosa* L. (a composite) "Daun roten" are likewise used.

Datura fastuosa (Solanacfae), powdered roots rubbed on the gums for toothache.

Cloves are sometimes stuffed into hollow teeth, or the face is poulticed with leaves of *Sida rhombifolia* L. (*Malvaceae*) or they are rubbed on the gums.

The latex of *Calotropis procera* "Lembega" *(Apocynaceæ)* a seashore shrub is put into the tooth.

Solanum aculeatissinum Jaqq. (*Solanaceæ*) Terong P'rat, the roots pounded with water are used for toothache. (Holmes who gives the scientific name as *Solanum pressum Dun.*)

OPHTHALMIA OR OTHER EYE DISEASE.

The eyes are bathed for opthalmia with a decoction of the roots of *Limacia oblonga* Miers (*Menispermaceæ* Akar Kuning).

The milk of *Euphorbia pilulifera* is dropped into the eye for conjunctivitis and ulcerated cornea.

The juice of *Portulaca oleracea is* also dropped into the eye.

The leaves of *Millettia sericea* Benth (*Leguminosæ*), a climber. "Akar mumbal" are applied to the eyes in cases of ophthalmia.

Weak eyes are shaded by pieces of Banana leaf which make a cool green covering.

Lawsonia inermis Henna. The roots are ground and used for the eyes.

Tabernæmontana coronaria (Apocynaceæ) "Akar Susun Kelapa." The roots are ground up and rubbed on the eyes.

EARACHE.

Dendrobium crumenatum S.L. (*Orchideæ.*) The pigeon orchid. The juice of the stems or pseudobulbs is dropped into the ear.

Ruta graveolens L. (*Rutaceæ*) aruda. The juice of the leaves is applied in earache (Holmes) as also is the juice of *Desmodium heterophyllum.*

SMALLPOX.

Is treated by the application of the leaves of *Pithecolobium microcarpum* Benth (*Leguminosæ*) "Petai Belalang" a common tree, which are pounded up and rubbed over the whole body. A decoction of the roots of *Acacia pseudo-intsia* (*Leguminosæ*) a climber with many thorns and feathery foliage, "Akar chuis" or "Akar Kupoh" is used to wash the body with.

Cocos nucifera L. Coconut palm. The roots are ground up and the decoction drunk in cases of smallpox.

SKIN DISEASES.

The native living in the tropics is very liable to a great variety of skin diseases and has a good many remedies for them.

One of the most important is the *Cassia alata* L. (*Leguminosæ*) "Daun Gelenggang, Daun Kurap." This shrubby plant with large primate leaves, and spikes of bright yellow flowers is common in damp spots in waste ground all over the tropics. It appears, however, to be of South American origin. Its use is well known almost everywhere. Its leaves are a specific for the disease known as Kurap, as well as for Tinea tonsuraus and other skin diseases. I have used it with success where other drugs have failed both on human beings and horses. The best way of applying the plant is to pound the leaves with water and apply them in the form of a poultice to the affected part. The plant is said to contain *Chrysophanic acid* which is probably the active principle which acts on the parasitic fungi, but I have known cases in which chrysophanic acid failed to produce a cure after some weeks while the leaves of the *Cassia* cured the patient completely in 48 hours. It does not seem to have been found possible to prepare an effective tincture from the leaves, hence it has not been included in most Pharmacopœias.

Modecca Singaporeana Mast (*Adenia Singaporeana*) (*Passifloraceæ*). A wild passion flower with small green flowers and scarlet capsular fruits. The roots boiled are applied for ringworm. The fruit is said to be poisonous.

Hydrocotyle Rotundifolia L. (*Umbelliferæ*). Pegaga umbon. The leaves of this little creeper rubbed up with alum are said to be good for skin disease of the scrotum.

Leucas Zeylanica L. (*Labiatæ*). "Ketumbit." A common weed with white flowers. The leaves are used for itch, and have a great reputation for this ailment.

Ruta graveolens L. (*Rutaceæ*). Arruda. The leaves ground up with turmeric are rubbed in in cases of rash.

Drymoglossum pilosellaides. (Filices.) "Sisik Naga." A common little fern creeping on trees, epiphytic. This is a remedy for the skin disease known as Kayap, its fronds are beaten up with gypsum (Nasilah), and the powder rubbed in.

Thespesia populnea Corr. (*Malvaceæ*) "Baru." Leaves bruised and mixed with the fruit are applied externally for headache and as a remedy for the itch (Holmes). It is also used in India for psoriasis, and attempts have been made to use it in Europe.

Lawsonia alba Lam. (*Lythrarieæ*). Inai. The leaves are used to allay burning of the feet in Beri-Beri and in skin diseases (Holmes).

Dolichos Lab-lab L. (*Leguminosæ*). "Kachang Kara." This is the common local French bean, the leaves of which (according to Holmes) mixed with rice-flower and saffron (turmeric) are applied in eczema and other skin diseases.

Calophyllum inophyllum L. (*Guttiferæ*). Oil of the kernel of the fruit used for ringworm (Holmes).

Viscum orientale. (*Loranthaceæ.*) The common broad-leaved mistletoe is used for pustular itch under the name of "Ubat Kudis." The leaves are burned to ashes, the ashes mixed with sulphur and coconut-oil and rubbed on the body. The native name of the plant is Selarapi.

YAWS.

Dr. Gimlette has published a valuable paper on the treatment of yaws, or puru as it is called here, in the "Therapeutical Society's Journal." The Kelantan Malays use for external application the latex of *Hunteria Roxburghiana*, known as Getah agu in Kelantan, and Getah jintan in Pahang. It is uncommon and highly prized, a red variety being most popular. The latex is obtained by cutting the live stem of the creeper, mixed with water to allow for its inspissation, and is sold in the markets at Khota Baru. It is smeared day by day on the sores. He states that it causes the sores to shrink.

Another latex which is valued is obtained from a jungle creeper called Akar Gam. The remedy is obtained by slicing the fresh fruit but also by incising the stem. It is used in the same way as the Agu, or the dry fruit is roasted and powdered and made into a paste with a little water. This creeper appears to be the *Willughbeia firma*, a well-known rubber vine giving the rubber known as Getah Gegrip.

Calamus ornatus. Rotan Segah Badak. The ashes of the stem of this rattan are used in cases of chronic and returning yaws.

Alstonia scholaris, the milk of this tree, the Pulai is mixed with sulphate of copper and applied to the sores.

Leea rubra (*Ampelideæ*). "Mali puchok merah." A shrub is used with white arsenic, the roots being ground into a paste. It is also administered internally.

Sauropus albicans (*Euphorbiaceæ*). "Chekup Manis" a common vegetable used as spinach is used in the same way the roots being ground up.

Jasminum bifarium L. (*Oleaceæ*). "Melor hutan" is used internally and *Clausena excavata* (*Rutaceæ*) Kemantu hitam, and Akar Jelai Batu. The roots of these are ground to powder and infused in cold water.

Baccaurea Wallichiana (*Euphorbiaceæ*). Tuko Takal, a tree is also used mixed with the Kemantu hitam.

Puruh of the foot is treated by making a small fire in the ground and covering it with a coconut shell or piece of bamboo and resting the foot on it so as to expose the sore to the heat. Kemantu leaves, or the leaves and bark of a species of *Canarium* (Kedondong) are put to smoulder on the embers.

Typhonium Roxburghii (*Aroideæ*). A small tuberous aroid common in gardens and waste ground and known as "Keladi Puyoh," is used for puru of the foot. The juice of the plant is mixed with lime.

STYPTICS.

Cibotium Barometz L. *(Filices).*—The golden furry hair from the rhizome of this fern is sold in the druggists' shops as a styptic to stop bleeding from cuts, for which it seems well adapted.

SYNCOPE.

*Eugenia pendens (*Myrtaceæ*).*—"Pohon jambu peṇawah bukit." Bruise the leaves in cold water and administer the cold infusion. Hot water is very harmful. A restorative in syncope (Kelantan, Dr. Gimlette). I have only leaves of this, but I think it belongs to the species mentioned above.

ALEXIPHARMICS.

For snake-bite the leaves of *Hedyotis capitellata* L. *(Rubiaceæ)* are used ground up and applied to the wound, and those of *Curanga amara*, "Gelumak Susu" are also used. *Psychotria Jackiana* Hook-fil *(Rubiaceæ)* "Ubat Halan" is also considered a remedy for snake bites and insect stings.

Snake-bite is however very scarce in the Peninsula, but there are many venomous beasts such as centipedes, scorpions and hornets, which sting or bite, and usually lime (chunam) is used to apply to the wound as it is usually handy being used in Betel chewing.

HAIR STIMULANTS.

Eclipta alba (Compositæ).—"Ubat Rambut Panjang." The leaves pounded and mixed with coconut oil are used to make the hair grow.

Cassytha filiformis L. (*Laurineæ*) dried and powdered with sesame oil is used as a tonic for the hair (Holmes) who gives the native name as Daun Kangkong (the real name of *Ipomea aquatica*). The hair-like form of this parasitic plant is probably the cause of the use of this plant.

Vanilla Griffithii Rchb. fil. (*Orchideæ*).—This climbing orchid has a very irritating milky juice which is applied to the hair as a stimulant.

Datura fastuosa.—(*Solanaceæ*) is used by Tamils according to Dr. Gimlette to stimulate the growth of the hair. The leaves are steeped in spirits.

VENEREAL DISEASES.

The drugs used for gonorrhœa are chiefly diuretics, or demulcents.

Thus *Phyllanthus nirari* L. (*Euphorbiaceæ*) a common weed used often as a diuretic is valued for this complaint. It is known as Dukong-Dukong Anak. The leaves and roots are chewed and the saliva swallowed, or a handful of the plant, and five whole onions are pounded up with the juice of a lime and five spoonfuls of coconut milk, the liquid strained and drunk early in the morning for three mornings is considered an invaluable remedy.

Physalis minima L. (*Solanaceæ*). Letop or Chipluan (Javanese), a decoction of the leaves mixed with those of the plantain (*Plantago asiatica*) is used. *Ph. alkekengi* is used in Europe as a diuretic and the plantain is said to have the same effect.

Labisea pothoina (*Myrsineæ*) "Akar Fatimah." A herb common in forests has some reputation also. A decoction of the roots is used.

Cassia angustifolia Vahl. "Sena Makki." (*Leguminosæ.*) The leaves (imported from Arabia and sold in the bazaars) when mixed with ghee and sugar are used in venereal diseases. The Cassia (Senna of commerce) is a well-known purgative.

Smilax China (Liliaceæ) Akar china. A well-known drug for venereal disease, imported from China. Holmes gives *Smilax ovalifolia* Roxb. and *glyciphylla* as used for syphilitic ulcers and ozæna.

Hibiscus rosa-sinensis L. (*Malvaceæ*). "Bunga Rayah." The flowers of the common hibiscus with a little water and sugar candy put out in the dew overnight, are used as a demulcent for gonorrhœa. The leaves are also used in the same way.

"Muldera baccata Miq." *Piperaceæ.* "Gadong Hutan." A decoction of the root is used in venerea disease (Holmes).

Canavalia virosa W. & A. (*Leguminosæ*). "Kachang Kachang" a decoction of the leaves given for gonorrhœa in one ounce doses (Holmes).

Hibiscus abelmoschus (*Malvaceæ*). "Kachang Bende." The fruits are used as a demulcent in gonorrhœa and dysuria (Holmes) Kachang Bende is however *H. esculentus*.

Arachis hypogea L. (*Leguminosæ*) ground nuts Kachang Tanah. A teaspoonful of the oil is given for a dose in milk, for gonorrhœa (Holmes).

Tabernæmontana Malaccensis Hook "Lada-Lada padang" "Perachit" and especially *T. corymbosa* Roxb. "Jelutong Badak" (*Apocynaceæ.*) Shrubs or the latter a small tree with milky latex and white flowers have a great reputation in syphilitic disease, and especially for tertiary syphilis (Restong).

Codiæum variegatum. (*Eupharbiaceæ*) Croton. "Puding mas." The yellow-leaved varieties, the root is ground up and rubbed in for syphilis.

Alyxia stellata Rœm & Schult. (*Apocynaceae*) "Pulasari." A decoction of the leaves and stem-bark is given in gonorrhea (Holmes). This pretty climber with white flowers has a very fragrant bark with an odour of coumarin. It is much used as a cosmetic.

Ocimum gratissimum L. (*Labiatæ*) "Selasih." An infusion of the seeds, which are mucilagenous and aromatic are taken in the morning as a laxative and also given in gonorrhea.

APHRODISIACS.

Are much in request and there are some plants which have a reputation for this among which Mr. Wray mentions *Smilax calophylla* Itah Tembaga, and *S. myositiflora* Dec. Itah Visi (Besih) (*Smilaceæ*) the first a low shrubby plant, the second a slender climber. The latter not an uncommon plant has the greatest reputation.

Balanophora sp. from Mount Ophir and Selangor, is supposed too to possess this property, and the Durian is also well known to be aphrodisiac.

Cinnamomum parthenoxylon Meiss. (*Laurineae*) Kayu Gadis, a tree abundant in Penang has a great reputation also, especially for strengthening girls. Its bark is aromatic.

DISEASES OF WOMEN.

The Malays have a very extensive series of medicines for female use and especially during and after confinement do they ply the patient with elaborate compositions of which the Ubat Priok, Ubat Beranakan and Ubat Jejamu are highly celebrated. They chiefly consist of aromatic and diuretic drugs. Besides these internal medicines they use astringent washes and powdered spices are rubbed over the body. Receipts for these are given below.

As emmenagogues. *Polygonum flaccidum* (*Polygonaceae*) a common knot-grass growing in wet places is used. The leaves are mixed with Aniseed (Adas-manis) and bark of Pulasari, (*Alyxia stellata*) ground up and given to drink. The *Polygonum hydropiper* is used in the United States for the same purpose. *P. flaccidum* is also used as an abortient.

Phyllanthus Urinaria L. "Dukong anak" mentioned above as a diuretic is also used.

Sesamum indicum L. Bijan. The oil of Sesamum is said to act as an emmenagogue (Holmes).

Piper longum L. (*Piperaceæ*) "Bakek. Five to ten grains of the powder or ½ to 1 fluid drachm of the tincture given to expel the placeata." (Holmes) "Bakek is properly however the name of *Piper miniatum*.

Psidium pyriferum L. Guava. The bark and leaves are used for the same purpose according to Holmes.

Mangifera indica L. Mango. The seed is useful in Menorrhagia and for hœrmorrhoids. It is said to contain gallic acid (Holmes).

Evodia triphylla Dec. (probably E. *Roxburghiana*) Tenga Burong (*Rutaceae*) an infusion of the leaves and fragrant white flowers are used as a tonic and emmenagogue (Holmes).

Curcuma Zedoaria L. (Tumbuk Lawa) a decoction of the rhizome is used as an emmenagogue in amenorrhea.

Mangosteen root (*Garcinia Mangostana*). A decoction is drunk for irregular menstruation.

Labisia pothoina (*Myrsineæ*). "Akar Katchit betimah." Boil the leaves and stem in water and drink two or three times a day (4 or 5 ounces at a time) only females may use it. Use for menorrhagia. (Kelantan, Dr. Gimlette.) This herb is also used in venereal disease. The native Kelantan name is interesting as the plant is supposed to be a sign of tin "timah" where it is found growing. The name in other parts of the Peninsula is Akar Fatimah, which is perhaps a perversion of Bertimah.

Wedelia biflora (*Compositæ*). "Serenah," or "Serunai Laut." A common sea-shore plant with yellow flowers. The leaves rubbed up with cow's milk are used for forty days to strengthen a woman after confinement.

After confinement a decoction of the following roots is given :—

Dissochæta punctulata (*Melastomaceæ*) "Akar Meroyan busuk," a climber.

Clerodendron nutans L. (*Verbenaceæ*). Meroyan Kabut. A shrub with white flowers.

Gomphostemna crinitum Wall. (*Labiatæ.*) "Mumjulong bukit." A herb occurring in mountain jungles.

Alpinia Galanga L. (Scitamineæ). False Galangal, "Lenkwas." A tall herb the aromatic rhizomes of which are used." It is also used in curry.

Globba Wallichii (*Scitamineæ.*) "Meroyan tingal, or Haliya hutan." A weedy yellow-flowered herb, the rhizome of which is slightly aromatic.

Eranthemum malaccense Clarke, (*Verbenaceæ.*) "Tampan putri." A shrub with violet flowers common in woods.

Ubat Priok Yang Orang Muda. A medicine for irregular menstruation in the young.

Lawsonia inermis. Henna leaves.

Murraya exotica. "Kamuning" the leaves.

Curcuma. Kunyit, The. Turmeric rhizome. Boil altogether and drink the decoction.

Ubat Beranak. This medicine is composed of the following drugs:—

Merchabolong, Galls.

Sudah ayer, flowers of some plant unknown.

Changkok Bunga.

Bunga Kasumba (*Carthamus tinctorius.*) Safflower. Flowers imported from Arabia.

Chuchur, or Churan Atap. *Boeckia frutescens* (*Myrtaceæ*) leaves dried. These aromatic and strengthening leaves are imported from *Tringanu* chiefly. They are also used in fever.

Chabei Tali (*Helicteres Isora* L.) *(Sterculiaceae.)* The curious twisted pods of this shrub are popular and largely sold in the shops.

Sepa rantu. *Sindora Wallichii* Benth. (Leguminosæ.) Prickly pods of a big tree.

Tahi Angin. *Usnea barbata* L. A common lichen at high elevations, used also as a cold medicine.

Bua Anjang. *Xanthium Strumarium* L. Fruits of this weedy composite.

Kuskus. *Andropogon muricatus* L. The roots of the well-known Cuscus or Vetiver grass.

Katumbar *Coriandrum Sativum* L. Coriander fruits. Jemuju *Carum Carui.* Carraway's.

Ubat Jejamu. All are pounded up and made into a drink.

Kayu Serapat. *Parameria polyneura* (*Apocynaceae*). The name is applied to several laticiferous barks.

Kayu manis China. *Cinnamomum* probably *C. Cassia* (Laurineæ). An aromatic clove bark.

Katumbar, Coriander fruits.

Musi, apparently the buds of *Artemisia.*

Mersawir. Bark of *Cinnamomum* imported from the Moluccas, and commonly sold in shops, often called Massay bark.

Jintan manis. Cuminseed.

Jintan hitam. *Nigella sativa* seeds.

Ujong Rahab.

Pulasari. Bark of *Alyxia stellata (Apocynaceæ)*. A climber the dried bark of which is scented as of Coumarin.

Puchok, Cost. Root of *Saussurea Lappa.*

Ganti.

Kalambac *(Aquilaria Malaccensis)* (*Thymeleaceæ*) Gaharu wood.

Chukor. Vinegar.

Kedawang. Seeds of *Parkia Roxburghiana (Leguminosae).* A big tree the seeds of which are used as a stomachic.

Sudah Ayer Flowers.

Kulit Manis. Bark of cinnamon. *(C. zeylanicum).*

Tahi Angin. *Usnea barbata.*

Daun Perawas. Leaves of *Lindera sp.*

Buah Pala. Nutmeg.

Gadong China. *Smilax China.* The tubers of this well-known remedy for venereal disease, imported from China.

Majakani. Galls of some plant.

Jiringu, *Acorus Calamus* L. The rhizome.

Tema Lawak *Curcuma zedoaria* L. Zedoary one of the turmerics, the rhizome of which is used.

Kapu Kaya, Kapulaga, Cardamoms.

Lada Ekor, *Piper Cubeba.* Cubebs.

Chabei Tali. Fruits of *Helicteres Isora* L.

Chabei. *Piper Officinale.*

Bawang Puteh. Onions.

Buah Chingkeh. Cloves.

Kuskus. Roots of Vetiver.

Lada Hitam. Black Pepper.

All of these drugs are ground up together and made into a decoction to be drunk at intervals. They are mostly spices with a few demulcents and astringents.

PREPARATIONS FOR RUBBING OVER THE BODY AFTER CONFINEMENT.

These are a number of drugs ground up very fine and made into flat disc-like cakes. The best known are Ubat bedah or Ubat param, and Ubat barut, Ubat Bedah, or Param.

Lampoyang. Rhizome of *Zingiber Zerumb.*

Kunyit Bonglei. Rhizome of *Z. Cassumunaar.* Two half-wild gingers common in villages. The rhizomes are somewhat aromatic.

Akar Morunggei. Roots of the horse-radish tree. *Moringa pterygospersma* Gaertn.

Akar Kaliki. Papaya roots.

Pulasari. Bark of *Alyxia stellata* Roem.

The cakes of this medicine are dissolved in warm water and rubbed over the whole body for 44 days after confinement.

Ubat Barut is composed of Asam Gelugur. The dried fruit of *Garcinia atroviridis* Griff, an acid fruit often used in curries.

Arang Parah. Soot from the kitchen.

Arang Tempurong. Charcoal of coconut shell.

Jeringu. Rhizome of *Acorus Calamus.*

Bonglei. Haliya barah. Ginger. *Z. officinale.* The cakes made of these drugs are dissolved in vinegar and rubbed over the whole body. As lactifuges, the flowers of *Jasminum Sambac* (*Oleaceæ*) Bunga melor are used as are other species of Jasmine all over the world.

The leaves of the the Morungei (*Moringa pterygosperma* Gaertn are rubbed on the breasts to present too rapid a flow of milk and should the breasts become painful the roots of *Desmodium polycarpum* (*Leguminosæ*) a common and pretty shrublet with purple flowers, "Rumput Kerbau d'rapat" are boiled and applied to the breasts.

For retention of urine in women during confinement the pith of the roots of *Bragantia corymbosa* "Akar julang Bukit.", a shrub by no means rare is eaten with Betel-nut. This curious plant of the order *Aristolochiaceæ* is not known to possess any medical properties.

LEMON GRASS OIL.

(PROFIT OF £200 PER ACRE.)

A product for which there is at present a good demand in the London market, late quotations being from 8-1-4d. to 8-1-2d., is the oil of lemon grass. The value of the product has steadily increased from a trifle over Rs. 40 to Rs. 58 per gallon, and is likely to rise higher in the near future.

Lemon grass luxuriates in a well-drained sandy soil but has been known to thrive also upon laterite provided the dry weather be not prolonged. It is also a lover of moisture in the soil but is unable to withstand waterlogging. For the highest purposes of its cultivation, however, the most suitable soil is an arenaceous clay and the best climate one which presents distinct alternations of sunshine and shower.

The crop will, under ordinary conditions, be ready for harvesting in the cold weather of the third year from planting it out. On cropping the grass it is committed to the still with as little delay as possible. The usual method adopted with the grass is aqueous distillation in copper stills. In plantation-grown grass at least two crops can be harvested in the season, so that, calculating on an average on a bundle of the grass (of six inches diameter) from each of the 5,000 clumps which may safely be counted upon to attain to maturity out of the 7,260 planted out, the yield of an acre may be estimated at 10,000 bundles. Fifty such bundles yield a quart (40 fluid ounces) of the oil, so that the 10,000 bundles would yield 200 quarts or 8,000 ounces. Valued at 8d. per ounce, which is the current average selling price of the oil in the London market, the produce of an acre would realise £269-13-4. Even should the crop cost £66-13-4 to raise, tend, harvest, distil and transport the oil to market, a profit of £200 per acre would be obtainable from it from and after the cold weather of the third year of its establishment.—*Times of Malaya.*

OPENING OF THE KRIAN IRRIGATION CANAL.

The opening of the Krian irrigation canal took place on August 16, 1906. The ceremony was performed by the Resident of Perak, Mr. E. W. Birch. A large and influential gathering of Europeans and Malays attended, and the proceedings commenced with a speech from Mr. Birch who spoke as follows:—

Ladies and Gentlemen,—It must be a source of the liveliest satisfaction to the Perak P. W. D. to see to-day the accomplishment of a work that has been on the tapis for seventeen years. It cannot be said of this work that it was hastily undertaken and too quickly carried through. It can be said of it that it was twice laid to rest and once greatly delayed. It can be said of it that it has been considered and advised upon by numerous Engineers, and that it has been the object of much criticism and scepticism. It can be said of it that outside advice has been often obtained, with the result that the advice of the Perak P. W. D. has been confirmed and largely adopted. It is an instance of how delay in carrying out a scheme in a new and progressive country has entailed greatly increased cost by reason of the simple axiom that continued progress means a continued rise in the price of labour and material. But the heat of discussion may well be now forgotten, and the difficulties encountered may well be looked back upon with pride. Krian was in urgent need of help from Government. Its inhabitants often suffered from water famine and epidemic disease. The annual rainfall did not greatly vary, but the rain fell fitfully, and padi planters could not make it their permanent home, for their crops not infrequently failed, and their supply of drinking water ceased at certain seasons. In 1889 Mr. Trump made a preliminary report. In 1891 Sir Frederick Dickson, whose knowledge of Ceylon irrigation schemes was unique, visited Krian. The people he met stated their desire for a supply of potable water, and he represented their needs. In April 1892 Mr. Trump wrote a report of which Mr. Caulfeild approved, and it is remarkable that in that report the present scheme, tinkered and criticised as it has been, was largely outlined. The impounding area is the same; the position of the spill weir is the same. The figure at which he placed the discharge of water has been all along adhered to. Mr. Trump estimated that 52,000 acres would be brought under the influence of the scheme. Mr. O'Shaughnessy cut this down to 45,000 and then to 42,000. It is interesting to note that it has worked out to over 51,000 acres, and that Mr. Trump was right. He referred to the Storage scheme, which, on the advise of Col. Murray, six years afterwards, was carried out, and he recommended the road which will shortly, fourteen years afterwards, join the district of Selama to that of Krian. It must have been intensely gratifying to Mr. Trump to read, as it is to me and to all who knew how well, how long, and how unobtrusively Mr. Trump has served the Government, to recall the graceful compliment paid by Col. Murray to his work of investigation, performed as it was under circumstances of the greatest difficulty. But the pressure of Railway construction, and the necessity for many other public works occupied the attention of the powers that then were, and the question slept. In 1893 I visited Krian and was impressed with its great potentialites as a rice-producing country. I was, I am glad to think, to some extent instrumental in rescuing the scheme from that oblivion which, in official language, is styled keeping in view. Sir Cecil Smith, than whom few men had a quicker grasp of situations, invoked the aid of the Government of India, and Mr. Claude Vincent came to study the question and reported on it in February 1894. He recommended the scheme but desired to raise the levels 2½ ft. all round, and gave an estimate of $300,000, or only $15,000 more than Mr. Caulfeild's scheme was to cost. His estimate was flagrantly wrong. The extra earthwork entailed by his proposal must have cost $140,000 more than the sum he put it at. It is only just to say that Mr. Vincent did not regard his estimate as accurate. The Indian Engineer who came after him, Mr. O'Shaughnessy, working on his lines, put the cost of the work, in July 1897, at $859,000, or a mere matter of over half a million more than Mr. Vincent's figures. It is a question that will never be settled, and need not be debated, whether the raising of the levels was necessary. There are those present who will never be convinced that it was. But the progress of Perak has, happily, been such that a matter of a few hundred thousands has not been of recent years an insurmountable obstacle. After further discussion and a report by Mr. Anderson, the opinion of Col. Murray was invited. He adopted the Storage scheme suggested six years earlier, but never included in any estimate, and this has been carried out and has brought the Selinsing area of an additional 20,000 acres under the scheme. Col. Murray's estimate was $785,000. The work was actually commenced in 1899, ten years after the preliminary survey. In 1900 Col. Murray's estimate was increased to $977,000, and in 1903 it was again increased by Mr. Anderson to $1,596,837. That sum, say $1,600,000, is what the scheme has cost. It is to the lasting credit of the Perak Government that it was not daunted by these enormous increases of cost, and to-day it is my privilege to open a great work, one of the most useful ever undertaken in these progressives States—a work which will some day enable the inhabitants to raise a rice crop from about 70,000 acres of land, which will give the people a potable, if not perfect, supply of water which will enable them to make the land of their adoption a permanent home, and which will result in their building for themselves houses of a more durable and comfortable type. With assured crops we may hope for the establishment of rice mills, and the people may anticipate better prices without paying for the maintenance of an army of small middlemen. There are those who will enquire what the interest will be on the Government investment. It may be put at 4%—perhaps not at once but certainly ultimately, and to that is to be added, what cannot be reckoned in dollars, the happiness and well-being of a settled population of busy peasants, of foreign Malays who in their own country will retail the news of how the Perak Government has ameliorated their condition and made of no account the variableness of seasons. I wish Sir Frank Swettenham could have seen the completion of this work. I wish it had been possible for His Excellency the High Commissioner to be present. He has kindly expressed his regret that urgent public business has taken him back to Singapore. I wish that the Resident-General had found it possible to be present. I have a message of regret at his absence from His Highness the Sultan, who has always been keenly interested in this great scheme. I am sure that Mr. Hale, Raja Chulan and Mr. Shaw, whose interest in the people and whose experience of the cultivation of rice is of the greatest value to Government, will see that their wants are always represented and that their Headmen carefully explain the scheme to them. I have already alluded to Mr. Trump's share in this work. I wish to express my appreciation of the assistance Col. Murray rendered in extending and commending the scheme. I wish to thank Mr. Anderson for his devoted work in carrying it out, for his endurance and fortitude in sickness and in the face of difficulties and disappointments. I wish to thank all the Engineers who from time to time have been engaged on the work, and especially Mr. Wilkinson and the present Staff who have ably completed it. And I wish to tender my congratulations to Mr. Caulfeild, who has been the Head of the Perak Public Works Department for a quarter of a century, and whose knowledge of the country from end to end of Perak is little short of marvellous. It is no little matter to have conceived, argued and fought for a scheme seventeen years, and to have been present at its fulfilment. His friends and brother officers are glad to see him as well as he looks to-day, and hope that he will still remain some time with them. When he does leave us it will be with well earned satisfaction that he will be able to reflect that something accomplished, something done, have earned a full repose. (Applause.)

Mr. F. St. G. Caulfeild thanked the Resident for his kindly remarks about him. In a short summary he gave the history of the present great undertaking from its infancy. He eulogised the work done by several engineers in years gone by, particularly Mr. Brown Dickson and the late Mr. de Trafford. He gave full details of the working of the scheme, the lengths of the various canals which extend to upwards of 56 miles, and are expected to irrigate over 140 miles of rice-growing country. The whole cost of the work, $1,600,000, spread over the whole area of reclamation only amounts to $22 an acre, or roughly speaking fifty shillings, and he was confident in years to come it would be a huge financial success in every way. (Applause.)

The Penghulus of the Krian District were then summoned before the Resident, and through Raja Chulan he explained to them in excellent Malay all that Government had done for the Malay community in undertaking this matter. He told them that besides always having an ample supply of good water they would always be certain of securing their paddy crops. He hoped to see Rice Mills erected in the near future in the district, and rice sold direct to the population without the middleman's profit as at present. He asked for their assistance in explaining these details to the villagers, and advised them to build good solid houses (not the ordinary Malay hut) where they could settle down comfortably and be certain of a profitable return from their labours.

The Penghulus thanked the Resident and retired.

GOW, WILSON & STANTON, LTD., INDIAN RUBBER MARKET REPORTS.

13, ROOD LANE, LONDON, E. C. *July 6th, 1906.*

At to-day's auction, 222 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which only 22 changed hands in the room. The total weight amounted to about 10½ tons, Ceylon contributing 2¾ and Straits Settlements nearly 8.

In sympathy with the Para market, demand was again weak for Plantation grades, few orders being in evidence. In consequence, most of the offerings were retired for want of support, but where sales were effected, prices marked from about 1*d.* to 2*d.* per lb. decline on last rates for the finer qualities, and no business was done in Scrap at the auction.

QUOTATIONS.—Fine sheet, 5/8¼.
Fine biscuits, none sold, value about 5/8.
Crape { Fine pale ribbon, 5/9 to 5/9¼.
Darkish, 5/5¾.
Dark, none sold.
Scrap, none sold.

PLANTATION FINE TO-DAY.—5/8 to 5/9¼, same period last year, 6/3 to 6/4½.

Do. SCRAP.—Value about 4/6 to 5/-, same period last year, 4/3½ to 5/5½.

FINE HARD PARA (South American).—5/-, same period last year, 5/6½.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

22 packages at 5/8 per lb., against 92 packages at 5/3¼ per lb., at last auction.

Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Geregama	1 case good darkish biscuits, bought in. 1 case good scrap, bought in.
Aberdeen	1 case good palish to darkish biscuits, bought in. 1 case good scrap, bought in. 1 case thick scrappy biscuits, bought in.
Wavena	3 cases good biscuits, bought in.
Ederapolla	2 cases good to fine palish biscuits, bought in. 2 bags scrap and rejections, bought in.
Warriagalla	1 case good pale Ceara biscuits, bought in. 1 bag good dark dull biscuits, bought in. 1 bag small rejected biscuits, bought in. 1 bag good pale Ceara scrap, bought in.
K. M.	1 case good Ceara biscuits, 5/6 bid.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Doranakande	1 case good dark scrap, bought in.
S A M. M	1 bag rejected biscuits and scrap, bought in.
Dolahena	1 case good scrap, etc., bought in.
Baddegama	1 bag lumps, bought in.
H L K	1 bag scrappy biscuits, bought in.
T C S R	2 cases small oblong biscuits, bought in. 1 bag scrappy sheet, bought in. 1 case good ball scrap, bought in. 1 case barky scrap, bought in.
Rangbodde	1 case exceptionally fine strong pale biscuits, bought in.
V S K M	1 case good palish to darkish biscuits, bought in. 2 cases good pale and dark biscuits and sheet, bought in. 1 case good rough Ceara biscuits, bought in. 1 case rejections, bought in. 1 case heated pressed sheet, bought in. 1 bag scrap and lump, bought in.
Culloden	8 cases very fine pale biscuits, 5/8¼ bid. 5 cases good darkish pressed crape, bought in. 1 case dark soft pressed crape, bought in.
Heatherley	3 cases darkish pressed crape, bought in. 2 cases very fine pale biscuits, bought in. 3 cases fine pale to darkish biscuits, bought in.
Ellakande	2 cases fine darkish biscuits, bought in. 2 cases good biscuits, bought in.
	Straits Settlements.
B R R Co Ld.	2 cases fine patchy amber sheet, bought in. 6 cases fine pale and palish crapey sheet and rolled sheet, bought in. 2 cases good dark crape, bought in.
C M R E Ld.	12 cases fine pale and palish crape, bought in. 6 cases good dark crape, bought in. 6 cases fine amber sheet, bought in.
Beverlac	14 cases fine pale to darkish amber sheet, bought in. 1 case fine darkish biscuits, bought in. 3 cases fine pale scrap, bought in. 2 cases loaded scrap, bought in. 1 case scrap and pieces, bought in. 1 case cuttings, bought in.
L E Muar	6 cases fine pale crape, 5/9. 2 cases darkish, bought in. 2 cases dark streaky, bought in.
F J R	3 cases fine Rambong scrap, bought in.
S P	1 case sheet rejections, bought in. 1 bag good scrap, bought in.
M I	2 cases fine large biscuits, bought in.
Semba	10 cases fine pale crape, 5/9¼ bid. 3 cases darkish, bought in. 1 case dark, bought in.
Highland	7 cases fine palish to darkish crape, 5/5¾. 3 cases darkish and black, bought in. 6 cases dark, bought in.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
P R S B G M	5 cases fine amber sheet, 5/8¼. 2 cases darkish scrap, bought in. 3 cases scrap and rejections, bought in.
S B	4 cases fine amber sheet, 5/8¼. 1 case fine scrap, bought in.
S S R	3 cases dark pressed scrap, bought in.
EB&G S O P do.	2 cases fine amber sheet, bought in.
T E L G M	1 case thick sheet, bought in.
S B B	1 case pressed scrap, bought in.
L & P F M S K	2 cases good palish to dark crape, bought in. 6 cases good darkish crape, bought in. 3 cases dark, bought in.
S R C Ld.	1 case soft dark pressed crape, bought in.
J E Ld.	2 cases scrappy sheet, bought in. 1 bag scrappy biscuits, bought in.
Jebong	17 cases fine large amber sheet, 5/8¼ bid. 2 cases scrappy sheet, bought in. 2 cases good darkish scrap, bought in.

GOW, WILSON & STANTON, LTD., INDIAN RUBBER MARKET REPORTS.

13, Rood Lane, London, E.C. *July 20th, 1906.*

At to-day's auction, 206 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which 77 were sold. The total weight amounted to about 8½ tons, Ceylon contributing 2½ and Straits Settlements nearly 6.

There has been a decided recovery in prices since the last auction, and for fine sheet and biscuits 5/9 was generally obtained.

Demand ran chiefly on the fine grades, and competition for scrap was again lacking ; a few parcels of this sold up to 4/9, but the greater part was bought in to be disposed of privately.

There were several parcels of the medium and dark grades of crape included in the auction, but these did not attract buyers, and there was only a small quantity of the palest kind offering.

Quotations.—Fine sheet, 5/9.
Fine biscuits, 5/9 to 5/9¼.
Crape { Fine pale, none sold.
Darkish, 5/4.
Dark, 3/6 to 4/1.
Scrap { Fine 4/9.
Medium, 3/6 to 4/-.

Plantation Fine To-day.—5/9 to 5/9¼, same period last year, 6/3 to 6/4½.

Do. Scrap.—Value about 4/6 to 5/-, same period last year, 4/3½ to 5/5½.

Fine Hard Para (South American).—5/2, same period last year, 5/6½.

Average Price of Ceylon and Straits Settlements Plantation Rubber.

77 packages at 5/3½ per lb., against 22 packages at 5/8 per lb. at last auction.

Particulars and prices as follows :—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Wihargama	1 case good palish Ceara biscuits, bought in. 6 cases good palish biscuits, 5/9. 1 case ball scrap, bought in.
M	2 cases fine pale Ceara biscuits, 5/9¼. 1 case good scrap, 4/9. 1 case scrap and rejections, 3/9.
Waharaka	1 case good palish to dark biscuits, 5/9. 2 cases fine scrap, 4/9.
Ballacadua	2 cases dark pressed crape (gritty), 2/6.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Warriagalla	1 bag rejected biscuits, 4/-. 1 bag good scrap, bought in.
Doranakande	1 case dark scrap, bought in.
S A M M	1 bag biscuits and scrap, 4/-.
Dolahena	1 case pressed scrap, 4/-.
Baddegama	1 bag darkish scrap, 4/-.
H L K	1 bag rejections, 4/-.
Langsland	5 cases fine darkish biscuits, 5/9. 1 case fine scrap, 4/9.
Culloden	5 cases fine pale biscuits, 5/9. 13 cases good pressed No. 2 crape, bought in. 2 cases dark pressed crape, bought in. 1 case dark block crape, bought in.
V S K M	1 case heated pressed sheet, bought in. 1 bag scrap, 3/6.
Heatherley	4 cases pressed No. 2 crape, bought in.

Straits Settlements.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
C.M.R.E Ltd.	12 cases fine palish crape, bought in. 14 cases part little darker, bought in. 6 cases dark, bought in.
BNA KL	3 cases fine large pale biscuits, bought in. 1 case fine palish scrap, 4/9. 1 bag good rejections, 4/-. 1 case fine palish biscuits, bought in. 2 cases fine palish amber sheet, bought in. 1 bag scrappy sheet, bought in.
BNS	1 case fine palish thin sheet, 5/9. 1 case fine palish scrap, bought in. 1 bag rejections, bought in. 1 case good palish scrap bought in.
A	4 packages fine amber sheet, 5/9.
B	13 cases good darkish amber sheet, 5/9.
F J R	3 cases fine pressed scrap (Rambong), bought in.
S P	1 case rejected sheet, etc., bought in. 1 bag pressed scrap, bought in.
S	15 cases fine sheet, 5/9. 2 cases dark scrap, bought in.
R R P S E C R	1 case good amber sheet, 5/9.
R W and Co.	10 cases fine dark amber sheet, bought in. 1 case fine palish to dark amber sheet, bought in. 3 cases scrappy sheet and scrap, bought in. 1 bag rough sheet, bought in.
S R & Co.	1 case fine palish pressed crape, bought in. 5 cases darkish No. 2, bought in. 3 cases good palish and darkish, bought in. 2 cases dark pressed, bought in. 7 cases darker, bought in. 2 cases dark, bought in. 3 cases very dark, bought in.
L & P F M S	3 cases darkish No. 2 ribbon, bought in.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
S R C Ld.	1 case soft block crape. bought in.
Highland Est.	2 cases fine darkish crape, 5/4. 5 cases good darkish and dark, bought in. 1 case dark, 3/6. 1 case greyish and reddish No. 2, 4/6. 6 cases darkish and dark, 4/0½ to 4/1.

SHIPMENTS OF PLANTATION RUBBER.

Exports from Colombo and Galle from 1st January to 25th June.

1906 ... ... 58 tons.

1905 ... ... 21½ ,,

Exports from Singapore 1st January to 15th June, 1906, 95 tons.

,, ,, Penang ,, ,, ,, 17 ,,

GOW, WILSON & STANTON, LTD., INDIAN RUBBER MARKET REPORTS.

13, Rood Lane, London, E.C. *August 3rd, 1906.*

At to-day's auction, 202 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which about 162 were sold. The total weight amounted to about 11½ tons, Ceylon contributing about 3¼ and Straits Settlements nearly 8¼.

Considering the near approach of the holidays and the consequently small attendance, the demand for the fine quality cultivated rubber was fairly satisfactory, though prices were sometimes fractionally lower than rates ruling at the last auction.

A few parcels of very fine pale bright biscuits and crape from Ceylon were well competed for and realised up to 5/9¼ per lb., the highest price of the Auction.

Orders for scrap and the lower kinds of crape were again wanting, but for the better qualities of the latter grade there was more enquiry than at the last Auction.

Quotations.—Fine sheet, 5/8 to 5/8½.

Fine biscuits { Pale, bright, 5/8¾ to 5/9¼.
Palish to dark, 5/8 to 5/8¾.

Crape { Fine pale, pressed, 5/8¾.
Palish to darkish, 5/1 to 5/6.
Dark, 3/6.

Scrap { Black, soft, 2/3.
Good, 4/4 to 4/6.
Fair to medium, 3/6 to 4/-.

Plantation Fine To-day.—5/8 to 5/9¼, same period last year, 6/1 to 6/3.

Do. Scrap.—About 4/- to 4/8, same period last year, 4/- to 5/1.

Fine Hard Para (South American).—5/2, some period last year, 5/6½.

Average Price of Ceylon and Straits Settlements Plantation Rubber.

161 packages at 5/6 per lb., against 77 packages at 5/3½ per lb. at last auction.

Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Talagalla	1 case fine darkish biscuits, 5/8¾. 1 case fine pressed scrap, 4/6 bid.
Warriapolla	7 cases fine pale to darkish biscuits, 5/8¾. 1 case good scrap, bought in.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Syston	1 case fine amber sheet, 5/8¼. 2 bags darker, 5/8¼. 1 bag good pale biscuits, 5/8¼. 2 pkgs. darker, 5/8¼. 1 case barky scrap, 3/6.
Doranakande	4 cases dark biscuits, 5/8¼. 1 case dark rough sheet, 5/-. 4 cases fine palish to darkish scrap, 4/4. 2 cases dark scrap, 4/-.
Palli	3 cases fine palish Ceara biscuits, 5/8. 2 cases little cloudy, 5/8. 1 case rougher, 5/7.
V S K. M.	1 case rejected biscuits, 5/-. 2 cases mixed scrap, 3/6. 1 bag rough Ceara biscuits and rejections, 4/3. 1 case heated pressed sheet, bought in.
Wiharagama	1 case ball scrap, 3/6.
Culloden	5 cases very fine pale biscuits, 5/9¼. 2 cases very fine pale block crape, 5/8¾. 2 cases fine pale pressed crape, 5/8¼. 1 case darkish, 5/6. 5 cases darker, 4/10 bid. 1 case very dark pressed block, bought in.
Ellakande	2 cases fine dark biscuits, 5/9.
Heatherley	2 cases fine pale biscuits, 5/9¼. 2 cases darkish pressed crape, 4/9 bid.
ngoya	1 case fine pale biscuits, part heated, 5/7¾. 9 cases little darker, 5/8¾. 3 cases fine palish pressed scrap, 4/6 bid.

Straits Settlements.

F J R	3 cases pressed Rambong scrap, bought in.
S	1 bag pressed scrap, 3/6 bid. 1 case fine amber sheet, 5/8¼ bid. 1 case paler, 5/8 bid. 1 case good darkish crape, bought in.
W P M	5 cases good darkish amber sheet, 5/8¼. 1 case thick black crape, 2/3.
P R S B G M	7 cases fine darkish amber sheet, 5/8½. 6 cases good dark scrap, 4/0½.
S B	4 cases fine amber sheet, 5/8½.
V R Co Ld Klang FMS C R	20 cases fine scored sheet, 5/8¼ to 5/8½. 4 cases good palish pressed crape, 5/4½. 2 cases darkish, 4/2½. 5 cases dark soft, bought in. 2 cases very dark, bought in.
R W and Co	1 bag good rough sheet, 5/-.
S R & Co.	1 case thick palish pressed crape, 5/1. 2 cases thin, 3/6. 5 cases darker, 5/1½.
GULA	4 cases fine thin pressed sheet, 5/8¼. 1 case good pressed scrappy sheet, 4/3.
PSE	2 cases fine palish amber sheet, 5/8¼.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
B R R Co Ld	1 case fine pale and dark crapey sheet, bought in. 4 cases fine darkish and dark amber sheet, 5/8¼. 1 case darkish sheet and biscuits, bought in. 1 bag good palish scrap, bought in. 5 bags good cuttings, 5/1¾. 9 cases fine scored amber sheet, 5/8 to 5/8¼. 1 case paler, 5/8. 3 cases good pale and darkish crapey sheet, 5/6. 4 cases good darkish thick crape, bought in. 6 bags loaded scrap, bought in. 3 bags good cuttings, 5/0½. 6 cases good darkish amber sheet, 5/8¼. 2 cases palish to darkish scored sheet, 5/8.

Shipments of Plantation Rubber.

Exports from Colombo and Galle from 1st January to 9th July.

1906	64½ tons.
1905	23 ,,
1904	17 ,,
1903	10 ,,

GOW, WILSON & STANTON, LTD., INDIAN RUBBER MARKET REPORTS.

13, Rood Lane, London, E.C. *August 17th, 1906.*

At to-day's auction, 293 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which about 189 were sold. The total weight amounted to 14 tons, Ceylon contributing about 3 and Straits Settlements nearly 11.

For the finer qualities generally the market was steady with a rather better tone. A particularly fine lot of large pressed Block Rubber from the Straits Settlements realised the highest price of the auction, viz., 5/10½ per lb., or 1½d. over the highest price paid for Sheet or Crape.

The lower grades again lacked attention, and the highest price paid for fine scrap was 4/6½, most of this quality realising about 4/6 per lb.

Quotations.—Fine pressed block, 5/10½.
Fine sheet, 5/9.
Fine biscuits, 5/9.
Good biscuits, 5/6 to 5/8.
Crape { Fine pale, 5/9.
Palish to darkish, 4/3½ to 5/5¼.
Dark, 3/2¾ to 3/9½.
Fine Rambong, 4/1½.
Scrap { Fine, 4/6 to 4/6½.
Fair to medium, 3/- to 4/1.
Low, 2/6.

Plantation Fine To-day.—5/9 to 5/10½, same period last year 6/- to 6/3.

Do. Scrap.—3/- to 4/6, same period last year, 3/3 to 5/5.

Fine Hard Para (South American).—5/2, same period last year, 5/7.

Average Price of Ceylon and Straits Settlements Plantation Rubber.

189 packages at 5/3¾ per lb., against 161 packages at 5/6 per lb. at last auction.

Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Arapolakande	6 cases fine darkish and dark biscuits, 5/9. 1 case good darkish biscuits, 5/8½. 2 cases good scrap, 4/3.
Ellakande	1 case dark pressed crape, 3/4½. 1 case darkish pressed crape, 4/3½.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Heatherley	2 cases very fine pale biscuits, bought in. 3 cases dark pressed crape, 4/3½.
V S K M	1 case heated sheet, bought in.
Culloden	2 cases dark pressed crape, 3/2¾.
S A M M	1 case rough cloudy biscuits, 5/6. 1 case lump and scrap, 4/1½.
MAK G D	1 case good pale Ceara biscuits, 5/7. 1 case dark heated biscuits, 5/6. 1 bag good palish crape, bought in. 1 case pressed scrap, bought in. 2 cases heated scrap, bought in.
H & C J. & Co.	1 case good darkish biscuits, 5/8.
Tallagalla	1 case fine dark biscuits, 5/9. 1 case fine pressed crape, 4/5. 1 case fine darkish biscuits, 5/9. 1 case fine pressed scrap, 4/6. 1 case barky scrap, 3/-.
T R R	4 cases good to fine biscuits and sheet, 5/9. 1 pkge. good scrap, and rejections, 4/-.
Ambatenne	3 cases fine palish biscuits, 5/9. 3 cases darkish, 5/8. 1 case good rejections 4/-. 1 case fine scrap, 4/6. 1 case dark, 4/1. 1 case dark barky, 3/3.
Densworth	1 case good palish biscuits, 5/9. 1 bag fine to darkish biscuits, 5/8. 1 fine pale scrap, 4/6. 1 bag low scrap, 2/6.
Waharaka	2 cases good darkish biscuits, 5/9. 1 case good scrap, 4/5.
Ballacadua	3 cases good palish biscuits, 5/9. 1 case darker, 5/8.
angbodd e	1 case very fine strong pale biscuits, scrap and cuttings, 5/4.
Dukwari	1 case fine darkish biscuits, 5/9. 1 bag fine pressed scrap, 4/6½.

Straits Settlements.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
GULA	4 cases fine amber sheet, 5/9.
V R Co Ld Klang FMS	19 cases fine scored sheet, 5/9. 25 cases darker, 5/9. 7 cases fine palish pressed crape, part sold 5/1¾. 14 cases good darkish, 4/3¾. 9 cases dark, 3/7.
A P	1 case good thick amber sheet, 5/6.
K P C Ld.	2 cases good lace, 5/3½.
B R R Co Ld.	7 cases good scored sheet, 5/9. 1 case pale amber sheet, 5/9. 14 cases fine thick palish crape, 5/9. 1 case little darker, bought in. 3 cases darkish and dark, 3/9½. 1 case dark, 3/5. 1 case fine amber sheet, 5/9. 1 case fine darkish biscuit and sheet, 5/8.
C M R E Ld.	5 cases very fine pale crape, bought in. 2 cases palish, 5/5¼. 43 cases fine pale and darkish, bought in. 12 cases dark and darkish, bought in. 1 case very dark 3/6½. 1 case fine amber sheet, 5/9.
Beverlac	5 cases fine amber sheet, 5/9. 3 cases pale to dark, 5/8½. 1 case pale to darkish biscuits, 5/7.
L E	

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Muar Straits	4 cases very fine large washed pressed blocks, 5/10½. 8 cases fine pale ribbon, 5/9. 2 cases good darkish, 5/- 2 cases dark, 4/3.
R M P Ld	6 cases fine red Rambong crape, 4/1½ 6 cases good palish crape, bought in. 10 cases good darkish crape, bought in.
MCI C D	1 case good darkish biscuits, 5/9. I bag thick rejected biscuits, 4/1.
S P	1 case fine amber sheet, 5/9. 1 case small, 5/9. 1 case good darkish sheet, bought in. 1 bag pressed scrap, bought in.
F J R	3 cases pressed Rambong scrap, bought in.
Highland Est.	4 cases good darkish and very dark thick crape, bought in.

Java.

Tjidjerock	5 cases fine thick pressed sheet, 4/1 bid. 1 case scrappy, bought in.

Darjeeling.

Badamtam	1 case very bright No. 1, bought in.
Tukvar	1 case do. bought in. 1 bag scrappy, bought in.

Malacca.

Abstract of Meteorological Readings for June, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		ins.	ins.
Durian Daun Hospital...	29·832	152·4	79·5	89·9	70·2	19·7	81·0	1042	62·7	93	S. W.	7·59	2·92

F. B. CROUCHER,
Colonial Surgeon, Malacca.

MALACCA, *1st August, 1906.*

Singapore.

Abstract of Meteorological Readings for July, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew point.	Humidity.			
	Ins.	°F.	°F.	°F.	°F.	°F.	°F.	Ins.	°F.	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory	29·872	139·2	81·4	88·8	75·1	13·7	78·1	·888	75·8	79	S. S. W. S. W.	10·98	2·40

K. K. Hospital Observatory,
Singapore, 15th August, 1906.

A. B. LEICESTER,
M. O.
T. O. MUGLISTON,
P. C. M. O.

Penang.

Abstract of Meteorological Readings for July, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory...	29·905	146·2	80·7	88·9	74·4	14·5	77·6	884	75·50	80	South	4·69	1·07

G. LUCY,
Acting Colonial Surgeon, Penang.

PENANG, *10th August, 1906.*

Malacca.

Abstract of Meteorological Readings for July, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Durian Daun Hospital...	29·834	150·5	79·1	89.0	69·7	19·7	80·8	1·030	62·0	93·	N. W.	10.61	1.61

Malacca, *20th August, 1906.*

F. B. CROUCHER,
Colonial Surgeon, Malacca.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for July, 1906.

District.	Maximum in Sun.	Mean Dry Bulb.	Temperature.			Hygrometer.			Total Rain-fall.	Greatest Rainfall in 24 hours.
			Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Humidity.		
Taiping	148	84·16	94	72	22	78·37	894	76	4·86	1·33
Kuala Kangsar	...	81·66	95	71	24	76·95	864	81	1·51	·33
Batu Gajah	160	82·49	94	71	23	77·41	874	79	5·08	2·93
Gopeng	...	82·20	94	68	26	77·25	872	79	3·81	1·46
Ipoh	...	82·46	94	72	22	78·31	914	83	3·55	1·53
Kampar	...	...	93	73	20	...	...	...	5·78	1·98
Teluk Anson	...	82·28	92	66	26	77·53	880	80	2·57	1·53
Tapah	...	81·42	93	70	23	76·76	859	80	4·85	3·00
Parit Buntar	...	82·86	92	71	21	77·22	860	77	4·89	2·80
Bagan Serai...	...	82·69	92	68	24	77·72	883	79	2·28	1·47
Selama	...	82·65	93	73	20	77·79	887	79	4·91	2·85

STATE SURGEON'S OFFICE,
Taiping, 14th August, 1906.

S. C. G. FOX,
Ag. State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for July, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·872	152·5	81·3	91·0	72·0	19·0	76·7	0·833	74·4	77	Calm	1·14	0·97
Pudoh Gaol Hospital ,, ...	..	..	..	..	..	..	..	..	..	..	..	0·97	0·63
District Hospital ,, ...	..	..	..	..	..	..	..	..	..	..	..	1·51	0·44
,, Klang	..	..	..	88·1	69·8	18·3	..	..	..	..	..	1·31	0·58
,, Kuala Langat	..	..	..	..	..	..	..	..	..	..	..	2·89	1·75
,, Kajang	..	..	..	91·1	71·6	19·5	..	..	..	..	..	2·09	0·80
,, Kuala Selangor	..	..	..	..	..	..	..	..	..	..	..	2·31	1·33
,, Kuala Kubu	..	..	..	..	..	..	..	..	..	..	..	4·39	1·85
,, Serendah	..	..	..	..	..	..	..	..	..	..	..	1·34	0·62
,, Rawang	..	..	..	..	..	..	..	..	..	..	..	1·27	0·85
Beri-beri Hospital Jeram	..	..	..	..	..	..	..	..	..	..	..	1·80	1·55
Sabah Bernam	..	..	..	..	..	..	..	..	..	..	..	1·42	0·36

STATE SURGEON'S OFFICE,
Kuala Lumpur, 17th August, 1906.

E. A. O. TRAVERS,
State Surgeon, Selangor.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for July, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	93·	68·	20·32	...	...	...	...	...	5·49	1·62
Raub ...	...	...	...	94·	66·	19·45	...	...	...	...	...	5·35	1·83
Bentong ...	...	...	...	94·	68·5	20·19	...	...	...	...	...	1·02	·61
Temerloh ...	...	...	...	94·	70·	18·	...	...	...	...	...	1·82	·67
Pekan ...	...	...	...	90·	71·	14·03	...	...	...	...	...	1·37	·55
Kuantan ...	...	...	...	94·	68·	19·83	...	...	...	...	...	4·14	1·10
Sungei Lembing ...	...	...	...	89·	66·	16·45	...	...	...	...	...	7·64	1·85

RAUB,
23rd August, 1906.

V. H. FRY,
State Surgeon, Pahang.

Perak.

Abstract of Meteorlogical Readings in the various Districts of the State for August, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	..	147	81.62	93	70	23	77.14	874	..	81	..	16.76	3.11
Kuala Kangsar	..	..	79.91	93	70	23	75.75	837	..	82	..	9.03	2.40
Batu Gajah	..	156	80.16	93	70	23	76.34	859	..	84	..	9.99	2.19
Gopeng	..	..	79.91	95	67	28	75.20	813	..	80	..	13.82	2.67
Ipoh	..	..	80.42	93	72	21	77.11	889	..	86	..	7.43	1.21
Kampar	..	..	..	93	70	23	..	..	..	..	..	16.88	4.90
Teluk Anson	..	..	80.90	91	63	28	76.92	872	..	82	..	11.07	3.33
Tapah	..	..	80.83	93	70	23	76.02	835	..	79	..	11.10	2.81
Parit Buntar	..	..	81.73	91	71	20	76.94	863	..	80	..	7.43	1.17
Bagan Serai	..	..	81.75	91	69	22	77.47	886	..	82	..	[illegible]	1.44
Selama	..	..	80.69	92	71	21	76.83	872	..	84	..	13.84	2.12

STATE SURGEON'S OFFICE,

Taiping, 10th September, 1906.

S. C. G. FOX,

Ag. State Surgeon, Perak.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 9.] SEPTEMBER, 1906. [Vol. VIII.

THIRD JOINT ANNUAL AGRI-HORTICULTURAL SHOW OF THE STRAITS SETTLEMENTS AND FEDERATED MALAY STATES, 1906.

Raffles Reclamation Ground, Singapore, Thursday, Friday and Saturday 16th, 17th and 18th of August.

President.

The Hon'ble The Colonial Secretary—Capt. Young

Chairman—Hon. John Anderson

Committee.

Col. Alex Murray
Dr. D. J. Galloway
Col. Pennefather
W. C. Michell
H. Payne-Gallwey
Hon. Tan Jiak Kim
Seah Liang Seah
Choa Kim Keat
J. Polglase
Hon. A. T. Bryant
St. V. B. Down
W. Nanson
W. D. Barnes
W. G. St. Clair
John Somerville
Hans Becker
Rajah Hitam Nongchi
C. B. Buckley
R. W. Egerton Eastwick
Rev. Father Gex

Honorary General Secretary:—H. N. Ridley

Honorary Treasurer:—Wm. Macbean

Honorary Secretary—Division A—W. Diepenheim
,, ,, B—Dr. Ellis
,, ,, C—P. S. Falshaw
,, ,, D—L. E. Gaunt (Horses)
,, ,, D—F. Hilton (Dogs)
,, ,, E—G. A. Hall
,, ,, E—E. F. H. Edlin (Schools)
,, ,, F—C. Wreford

JUDGES.

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D. W. Lovell, Robert Little, W. Dunman, L. C. Brown, W. Diepenheim, E. Bramall, A. J. C. Hart, F. H. Darke.

Division B.

St. V. B. Down, W. Nanson, Rajah Hitam Nongchi, Chua Kim Keat, Dr. Ellis.

Division C.

CATTLE—H. A. Crane, P. S. Falshaw.
POULTRY—C. L. Van Cuylenburg, W. L. Hawtrey.

Division D.

HORSES.—Major General Inigo Jones, C.V.O., C.B. -
Capt. Leveson Gower (The Sherwood Foresters).
C. Sugden,
Major O. C. Woolley Dod,
L. E. Gaunt,
P. S. Falshaw,
Lt.-Col. Pennefather.
J. B. Young.

DOGS.—J. D. Saunders, Esq., K. A. Stevens, Esq., Capt. The Hon. C. Baring, F. Hilton, Esq., P. S. Turnbull, Esq.

Division E.

A. Hale, W. S. Coutts, L. Wray,
(SCHOOLS) E. F. H. Edlin, Rev. H. C. Izard, C. M. Phillips.

Division F.

A. F. G. Keller, K A. Stevens, A. J. Macdonald, F. C. Wreford.

The Agri-Horticultural Exhibition, 1906.

The third of the Agri-Horticultural exhibitions of the Colony and Federated Malay States was held at Singapore on August the 16th, 17th and 18th, on the reclamation ground in front of the Raffles Hotel. The weather proved fine for the greater part of the time but a heavy shower during the second day caused the ground to become for a time very muddy and wet. This, however, interfered but little with the enjoyment of the general public whose interest in the exhibition was attested by the great crowds which thronged to the entrance on all the three days, giving the working committee no small labour in taking the tickets and giving change. Two ticket offices were opened but these were insufficient for the purpose. A large number of subscribers and exhibitors and their assistants had free tickets but besides these no less than $5,300 were taken at the gates, so that upwards of 50,000 people visited the show grounds. On the previous occasions two exhibitions at Kuala Lumpur and Penang the gate money amounted respectively to $300 and $622.20. The price of admission to the opening ceremony was $2 and on all other occasions 25 cents a head. On the second day the school-children were admitted free and added not a little to the crowd of visitors.

Programmes of events were sold at ten cents each and were readily bought. In spite of the vast crowd which attended the exhibition there was no disorder or trouble of any kind; and there were no thefts of any importance. The few losses which did occur of articles in the exhibition were mainly due to the carelessness of exhibitors, who sometimes delayed for days after the exhibition was over to claim their exhibits.

Buildings.—The general arrangement of the buildings was designed by a committee consisting of Mr. R. A. J. Bidwell, Mr. Down and Mr. Buckley.

The plan and form of the various buildings was designed and executed by Mr. R. A. J. Bidwell, to whose untiring energy the success of the exhibition was largely due. The plan was very superior and in many ways much more convenient than that of previous shows, and the whole building was on a much more extensive scale. The Agricultural produce and native industries were housed in a long shed of poles and attap roofing, 450 feet long and 50 feet wide, half devoted to each division.

The house for plants and vegetables, 225 feet long and 50 feet wide with two projecting wings of 50 square feet. The house for cut flowers and vegetables was 100 feet long by 50 wide.

The poultry was housed in a separate shed, 75 feet long by 50 wide.

The dogs occupied a space of 125 feet by 50. Besides these a very large area was occupied by the buildings of the different firms, refreshment rooms, lavatories, Secretary's office, a grand stand by the show ring, stalls for horses, and sheds for the cattle. The whole of the ground occupied was 1,400 feet in length and 300 feet broad, or 14,000 square yards in area.

Management.

The Committee for the show was a very large one, but the whole work of the show really devolved on a very small number of workers. Fortunately they had the assistance of a number of the visitors from the Native States, who materially assisted in the arrangement and judging of the exhibits.

The buildings were planned and executed by Mr. R. A. J. Bidwell and were far the best both in design and plan of any at previous shows, and very much more extensive. The general arrangements for the exhibition were effected by Mr. Bidwell, Mr. Diepenheim, the Hon. Secretary and Mr. J. S. Isaac (Clerk of the Gardens Department) assisted after the opening of the exhibition by Messrs. Marriott, Hall, Edlin, Hilton and Buckley.

The arrangement and judging of exhibits were as follows:— Agricultural Section:—Mr. L. Brown, A. J. C. Hart, D. W. Lovell, F. H. Darke, Hon. Sec., Mr. W. Diepenheim, Mr. E. Bramall. Fruits, flowers and vegetables:—Mr. Down, Dr. Ellis, Mr. Pereira, Mr. Campbell, Mr. Main, Mr. Chua Kim Keat. Rubber:— Mr. Zacharias.

Native Industries:—Messrs. Collinge, Wray, Simmons, Chevallier, C.M. Phillips, W. S. Coutts, E. F. H. Edlin. Cattle:— Mr. Falshaw, Mr. H. A. Crane. Poultry:—Mr. W. L. Hawtrey, Mr. C. L. van Cuylenburg.

Horses:—Mr. Gaunt, Mr. Sugden, Payne-Gallwey, J. B. Young, F. Hilton, J. D. Saunders, Major-General Inigo Jones, Colonel Pennefather.

Dogs:—Messrs J. D. Saunders, K. A. Stevens, Capt. Hon. C. Baring, F. Hilton and P. S. Turnbull.

The thanks of the Committee are due to the Government of the F. M. S. who were good enough to carry exhibits free and exhibitors over their railways and to the Manager of the Singapore Railway who did the same. The Straits Steamship Company also gave a rebate of 25 per cent. of the freight of exhibits and the native visitors had also the use of the "Sea Belle" to come and return from Malacca and Penang.

The number of native visitors from the Native States was about 750, and there was some difficulty in housing them at first. The only available building in Singapore large enough for them was the new Tan Tock Seng Hospital ward, but this was so far away from town as to be practically inaccessible to them, and eventually they were housed in various parts of the town, their expenses being paid out of the exhibition funds.

There were also visitors from Ceylon, Burmah, India and two delegates from the Botanic Gardens of Buitenzorg and many others from the Dutch Colonies.

Exhibitors.

The whole of the Federated Malay States and the different parts of the Colony sent exhibits to the show, viz., Singapore, Malacca, Penang, Province Wellesley, Johore, Muar, Pahang, Negri Sembilan, Selangor and Perak. The Siamese States in the north of the Peninsula were however not represented. Of these Perak came first in competition winning 133 prizes of the value of 837 dollars and besides carrying off the Governor's Cup. It is to the credit of this State too that nearly every exhibitor succeeded in securing a prize, showing a careful selection in what was to be sent, by the district officers. Eighty of the prizes were taken by Malays and twenty-one schools also carried off prizes, only seven of the prize winners in this State were Europeans. This in itself shows that the exhibitions are well considered by the natives and that they take a great interest in the competitions. The total number of exhibitors from Perak was three hundred and sixty-four. The exhibits from the Native States would have probably been poor were it not for the energy and perseverance of the various district officers and other officials of the Federated Malay States also. Singapore came next to Perak both in number of exhibitors and in the prizes taken. In this calculation horses and dogs naturally were more easy to show at the seat of the exhibition than from elsewhere, are excluded or Singapore would be first. The small amount of cultivation of agricultural produce in Singapore as might be expected lowered its average, though it had some advantages in the horticultural section. There were 252 exhibitors, the greater part of whom were Europeans, and 124 prizes fell to them valued at 647 dollars.

Penang comes next with 75 prizes but only 106 exhibitors, of whom the greater number were natives.

Then Malacca with 131 exhibitors and 49 prizes almost all of whom were Malays.

Selangor sent eighty-nine exhibitors only who obtained 39 prizes of the value of 173 dollars.

Negri Sembilan had a hundred exhibitors but these only obtained nine prizes of the aggregate value of 56 dollars.

Johore sent exhibits from thirty-one exhibitors, all Malays, who carried off twelve prizes valued at 49 dollars.

Pahang which is in the worst position of any State for sending exhibits had sent three exhibitors of whom one scored a first prize for wild guttas.

The total number of exhibitors was 1,006. This was a smaller number than that of Penang on the previous year, but the fact that while Penang is well supplied with rail to most parts of the Peninsula, exhibits for Singapore had to come by sea, which was inconvenient and no doubt deterred many exhibitors from sending.

OPENING CEREMONY.

The Exhibition was visited by His Excellency Sir John Anderson in the early morning when he made a tour of inspection of the various exhibits, and at 11 a.m. of August 16th he on being requested by the Hon. Captain Young, the Colonial Secretary, President of the Exhibition, formally declared the Exhibition open in a speech which we herewith give:—

SPEECH BY H. E. THE GOVERNOR.

His Excellency the Governor, Sir John Anderson, K.C.M.G., said that this was the third time he had been called upon to receive the great privilege of performing the opening ceremony at functions similar to this one. Two years ago he opened the first of these Shows, and he was sure all those who were at Kuala Lumpur then would remember with satisfaction what an excellent Show it was. Last year he had the privilege of opening the Show at Penang, and every one who saw that one must admit that Penang made an immense advance on the first one. That day they had the third. This Show had now come to be regarded as an annual exhibition and it had now been fairly established as such. He was sure that those who had been privileged to see the produces of the two previous Shows would admit that in every way this the third one was a distinct advance on the others, not only as regards the extent and variety of the exhibits, but also as to the organisation and accommodation provided for those who came to profit by what they could see and learn there. To those who originated these Shows it must be very gratifying to find they are fulfilling such useful purposes and, their being organised, managed and run as they were by practical men, was proof enough, if proof were needed, that they were practical in character. To all of them who were so to speak outsiders and belonged to the general public, these Shows had the interesting feature of being so to speak annual stocktaking times when they saw and heard of the progress which had been made during the year in the agricultural development of the country, and they could also see what kinds of products they had here, thanks to the kindness and enterprise of the merchants of Singapore and elsewhere. If they would make a tour of the ground they would see that there was little that humanity wanted here below which could not be procured in the Malay Peninsula.

The great point about these Shows was the chances they offered to agriculture and to those engaged in work in connection with agriculture. Here they saw the practical results which had been attained by those who were lessons of future success. They add to the development of the Peninsula. They were able to come here to compare notes, to see where each of them had succeeded or failed, and to profit by the success and failure of others. They would see what had been already achieved and learn how it had been achieved. In agriculture and indeed in every branch of life, the battle was not always to the strong, nor the race to the swift, but to him who was ready to learn from success and failure the lesson of future success. They had to remember that it was not only a useful education to those engaged in agriculture, but this Show furnished also a most valuable stimulus to those, who when they saw other people's products better than theirs, were moved to go back and better their own achievements; it was a stimulus to them to resolve to do better next year and so the whole community reaped the great advantage of a continued and growing chain of increased effort and renewed intelligence in agricultural working.

To the Government it was particularly interesting to see these exhibitions because he thought they must all recognize that they marked periods of advancement in the development of the community. Hitherto most of the world outside and even those of themselves had been content to regard this as a land where they depended on the rich natural harvest of the earth which they gather without cultivation. He did not think hitherto in the eyes of the world or the merchants of the world that the products of the earth had bulked very largely in an estimate of the wealth of the Malay Peninsula, and whilst the natural harvest of tin, and jungle produce was still very rich and plentiful, it was very gratifying and interesting to find that while that was so, and appeared likely to be so for a long time, our planters were turning themselves with energy and resolution to the permanent cultivation of the soil. So long as we were entirely dependent on the natural harvest of the earth, we could never expect to have any really permanent and abiding community in this part of the world, and he was sure that when they found they were beginning to take themselves seriously as an agricultural community, they should find the world beginning to look to them as a field of some of its most valuable products. They could feel then they were laying the foundations of a legitimate stability of a trade from which Penang and Singapore, the gates of the Peninsula, must reap a great share. When they were privileged to go round this Show they would find much to interest them, and much to profit by. They would see the results of the methods of the European planter, which had been brought to the highest state of perfection possible at present, and they well know the high value put upon the products of that work in Europe.

But they would see something if possible more interesting, the results of those native cultivations which had been going on from time immemorial; these included not only the exhibits of paddy and other crops, but also models of the implements used in producing those crops. And they would also see numerous specimens of every interesting native art and craft. It had always been a matter of great regret that these native arts and crafts were to such an extent a matter of history, and in spite of efforts made by some energetic officers in different parts of the Peninsula, they were still far from being in a healthy condition. He hoped the result of this and previous exhibitions would be to give a great impetus in that direction. When the native artisan discovered there was a really good and profitable market for what he produces it would do much to encourage the production of those beautiful specimens of Malay silver and weaving, which were now too much things of the past. He thought in that way the people of Singapore could do much to encourage those officers who had been so unselfishly trying to develop these arts. And if it resulted in giving such a stimulus and revival, those officers would feel that they have reaped a very rich reward. The people of Singapore would recognize the debt they owed to the splendid work which has produced the result before them, and the generous co-operation which had been offered to them in the matter not only by the sister Settlements, but by the F. M. S. also. They had here he believed something like 350 Penghulus who had come in charge of various exhibits, some of them from very long distances right away on the northern borders of Perak, and it would be a great stimulus and advantage to them to come into contact with European civilisation in one of its busy marts such as Singapore is.

He thought the visit of these men spoke volumes for the excellent relations between Europeans and the Natives over whom they are placed. And it was very gratifying to Government to see these rulers so sympathetic. Our rule here did not rest upon force, but entirely on the good will of those over whom we were placed, and the fact that he had just alluded to prove that the good will was founded on a rule of sympathy and appreciation on the part of the European officers, who were placed in the various districts of the Peninsula. He was sure that the people of Singapore would recognize what they owed to these people. He was sorry that his friend the Sultan of Johore was not present that day. He had taken very great interest in the Show and had given a large subscription and he was sorry that he was not able to be with them that day.

Having already been round the Show he was amazed at the wonderful organization and extraordinary amount of work, both mental and physical, which it must have involved for the members of the various Committees, who had so generously and disinterestedly taken the matter in hand. When they went round they would see for themselves the extraordinary extent and variety of the exhibits, and the admirable manner in which they were displayed, and they would he thought agree with him that the best thanks of the community were due to those who had worked so wonderfully in the collecting and placing of the exhibits. To the building committee their special thanks were due not only for the admirable arrangements made, but also for the great success achieved in so short a time. And their heartiest congratulations were due to Mr. Bidwell and Mr. Buckley, for their splendid services, and in a hardly less degree to the members of the other Committees. He had much pleasure in declaring the Show open. (Applause).

The exhibition was then opened to the public, closing at 6 p.m. In the afternoon the hack gharries, harness horses over 14.2, and hacks under 14.2 were judged. The Sherwood Foresters and Town bands performed.

On the 17th, a public holiday, the exhibition was opened from 8 a.m. to 6 p.m., and the schools visited the show ground from 2 p.m. to 4 p.m. In the afternoon the polo ponies, hacks over 14.2, harness ponies and lady's hacks were judged. On the 18th the exhibition was opened as before and in the afternoon there was a dog-show from 2 p.m. to 6 p.m. and driving and jumping competitions in the ring from 3 p.m. to 5-15 p.m. At 5 o'clock Miss Anderson awarded the prize cups to the various winners and the Show closed at 6 p.m.

It was proposed at first to continue to keep the exhibition open for two days more, but as the native visitors had to leave on Sunday afternoon and Monday it was found advisable to close the exhibition as had previously been arranged.

The band of the Sherwood Foresters and the Town band performed during the afternoons, and the former at the opening ceremony.

AGRICULTURAL SECTION.

The exhibits of agricultural produce were contained in one half of a long building the other half of which was devoted to native industries. It had been agreed previously to allow competition from any part of the Peninsula from the Isthmus of K'ra to Singapore. Few exhibits however were received from the northern States but all the others including for the first time Johore were well represented. Exhibits of considerable interest not for competition were also shown from Java and Borneo, among them was conspicuous a large series of damars, sugar, tea, oils, sago, nutmeg-butter, spices from Java and the Moluccas exhibited by Mr. Diepenheim.

The whole exhibit of agricultural produce was little if at all inferior to that shown in Penang last year, but it must be remembered that the greater distance of Singapore from the main agricultural districts would to a certain extent curtail the amount of produce brought down by rail and boat.

All classes of agricultural produce were shown excepting clove oil and boiled rice.

The judges in this section were Mr. Diepenheim, Mr. L. Brown, Mr. Hart, Mr. Bramall, Mr. Darke, Mr. Zacharias, Mr. Scouler, Mr. Lovell and the Hon. Secretary, while several native penghulus assisted in judging in the classes of articles of native consumption.

Arrowroot.—The prize for the best roots was taken for the third successive show by Mr. H. H. Norris, whose sample would be hard to beat. The whole of the specimens in this class were good.

Prepared arrow-root was also first class. There being several samples of high merit.

Tous-les-mois.—The rhizomes of *Canna edulis* were shown under arrowroot. One sample was shown last year in Penang and this time two were staged, one of which was exceptionally good and obtained a special prize. This kind of arrowroot is popular with the Javanese and its cultivation might well be developed.

Betel nuts.—Fresh betel nuts were well shown, and there were some fine clusters. A fine bunch of the popular variety known as Pinang Wangi carried off the first prize. Hardly as many were shown this year as last year and the same applies to dry and split betel nuts of which however there were some fairly good and superior samples. Specimens of the large red betel nut known as Pinang Penawar (*Actinorrhytis Calapparia*) were shown. The Malays attach however little value to this fruit, it being chiefly used in medicine and magic.

Sirih leaves.—Were fairly represented with both Chinese and Malay varieties, chiefly the latter which is more popular. The samples were pronounced very good by the Malay connoisseurs who aided in judging them.

Medicinal plants.—The class for the collection of medicinal herbs was very extensive, the largest ever shown. There were forty collections some containing over two hundred different herbs and drugs. Mr. Machado carried off the first prize for these with a beautifully prepared series showing the specimens dried as for a herbarium, as well as dried as the drug, and put up in bottles.

Fibres.—This class of produce was better shown and staged than on previous occasions, though there was nothing equal to the collection shown by Mr. Schirmer in the Kuala Lumpur show. There were twenty-two exhibits, Mr. Machado winning a first prize with a fine set of samples, very well shown. There is doubtless a future for fibre in the Malay Peninsula. Many grow extremely readily, and there is a constant demand for high class and even second grade fibres in the European markets.

Cotton.—Some samples of this were decidedly good, but much was very poor. Mr. Machado's Egyptian was very fine. A good deal of that shown by natives was ill-cleaned, and one or two tempting looking baskets were discovered to have a fine sample at the top with very inferior specimens below.

Kapok was largely represented, and most of the samples good, some being very superior.

Cocoa pods.—Were much more largely represented this year than on previous occasions, and some samples were very fair and clean, mostly of the red varieties Sangue Toro, and Forastero. The green and yellow varieties do not seem popular. None of the pods were of very large size, and none were fully ripe, still signs of an increase in the cultivation of this product are very welcome.

Dragon's blood was well represented, and the winner of the first prize exhibited a complete series of specimens illustrating the history and manufacture of this product in the form of a living plant of the rattan *Dæmonorops propinqua* which produces the drug, a portion of an adult stem with panicles and fruit, the little mat basket and tripod, with the cockleshells used in separating the resin from the fruit, a bottle of the powdered resin of first class quality and a cake of the pressed dragon's blood as exported. All the samples shown this time seemed to be derived from *D. propinqua* though at previous exhibitions dragon's blood of other species was shown.

Coconuts.—Mr. Lawrence Brown, the Government Inspector of Coconut Trees in the Malay States, acted as judge of coconuts as well as other agricultural produce, and writes: "As at the two previous shows there were a great many fine exhibits of coconuts and all the classes were not only well filled but well represented. The best collection of varieties of coconuts consisting of no less than thirty-one kinds was that of Hadji Mohamed Yassin of S'tiawan and received the first prize, and Mr. Prior of Golden Hope Estate, Klang, easily obtained the second prize with an excellent exhibit of twenty-two varieties, while another collection of fourteen varieties staged by Latip bin Eusope of Malacca carried the third prize.

"The husked coconuts were plentiful in numbers and of good selection. The first prize was taken by Penghulu H. Aminudin of Sungei Tinggi, Perak, with a most excellent exhibit, but the judges found it exceedingly difficult to fix upon the second and third in order of merit, there being so many of a very fine standard.

"In unhusked coconuts of which there was an equally large collection the same difficulty arose, and although there was no disputing the superiority of the sample that carried off the first prize the difference between some of the others was very little, though there was no reason to grumble at the final decision."

Mr. Brown brought with him from Pahang, Temai Ulu, a fine young coconut with three strong shoots from one nut and some specimens of the variety known as "Kelapa Dadeh" an uncommon tree. The peculiarity of this nut is that when thoroughly ripe and well shaken up before being opened, it will be found that the whole of the "milk" becomes consolidated and forms as it were a second thick layer of "meat" which if eaten fresh is not only very easily digestible but very pleasant to the palate.

Copra.—The samples both of sun-dried and kiln-dried copra were excellent, except that none of them appeared to be sufficiently dry. This however might be accidental in samples coming loose from a long distance by sea.

Oils.—These were as usual a large feature in the exhibition, and there was a very extensive series, most prominent and attractive was the collection of *Essential Oils* from Kamuning Estate, which were not only magnificent samples, but beautifully staged in ornamental bottles on a polished wood and glass frame. Mr. Machado showed samples of oil of calamus, citronella, patchouli, lemon-grass, lemon, and nutmeg, easily winning the first prize.

Katz Brothers staged a nice little lot of citronella and patchouli of high quality from Tampinis Estate.

Coconut oil.—Was as usual represented by a vast array of bottles of very varied values.

Castor oil.—Was somewhat scanty in samples, but good of its kind.

A number of samples of medicinal oils and mixed oils, and other preparations highly esteemed by the Malays as medicaments were shown.

In Mr. Diepenheim's collection from Java and the Moluccas were some excellent samples of pea-nut oil, citronella and kajeput oil, which were very attractive.

Oil-cake.—Was better than usual and some first class samples were shown.

Illipe butter.—Made by the Singapore Oil Mills was shown also, an excellent sample of this valued preparation.

A sample of *Nutmeg-butter* which has never been seen at these exhibitions previously was shown in his collection of specimens from the Dutch Indies by Mr. Diepenheim. It is used in medicine, and was formerly at least a manufacture of Penang.

Tea.—Was represented by six exhibits, the well-known product of Durian Tungul Estate carrying off the first prize.

Coffee.—Although the cultivation has of late years almost disappeared from the Peninsula, or more correctly diminished to a very great extent, was better represented than in Penang last year. Golden Hope Estate as on previous occasions holding the front rank with its Liberian. Bailey's *Stenophylla* hybrid was represented by two or more good samples. Should coffee come back again to the Peninsula some time, as we may hope it may, we shall look for a great future for this superb variety.

Sugar-canes.—Were fairly well shown, there being in all fifteen exhibits of specimens and collections, some of these were excellent. With the decadence of the sugar industry nowadays, and the distance which Singapore is from the sugar cane district, it is not to be wondered that eating canes predominated in the collection.

Prepared sugars.—Were abundant especially those of coconut and kabong palms. These popular and nutritious sweetmeats were of excellent quality in many samples and gave the judges some trouble to decide on their respective merits. Nipah sugar, never largely represented, was hardly shown at all. Its softness and treacly stickiness make it less popular than the firm dark toffee-like coconut and kabong sugars. Native cane sugar was also good and well made and brown, white, and refined though not largely shown were of good quality.

Toddy.—Was illustrated by several samples and was as usual judged by Tamils for no European can appreciate the flavour of this native spirit.

Rum and *Rum Shrub* were shown in a very small series, but the samples were mostly good, and required some care in judging.

Honey.—For the first time at any show in the Peninsula, cultivated honey was shown by Father Gex of the Mission Étrangéres, who may well be called the pioneer of apiculture here. He showed not only a fine lot of combs, run honey and wax, but also had small glass cases of the bees at work which proved a great attraction to the natives, many of whom had the opportunity of watching the bees busily engaged in making up their combs for the first time in their lives. The bees which Father Gex is so skilful in cultivating are not the European hive bee, but the Indian kind, *Apis indica*, a common bee here. It is a smaller insect than the English bee. It may be hoped that this attractive exhibit may induce some of the natives to cultivate the art of bee keeping, which indeed is not absolutely unknown in the Peninsula, as I have seen in the homes of Chinese near Batu Pahat, hives of cylindric shape made of rattan hung up in the rooms and tenanted by the same kind of bees. Dr. Haviland of Kuching, many years ago devoted some time to apiculture and introduced European bees also from Italy, but they did not thrive as well as the local kind.

The honey both in comb, and run, shown by Father Gex would be hard to beat and the wax produced was of the highest quality.

Samples of the comb of the large wild bee *Apis dorsalis* were also exhibited. This is the common large bee which produces only one large comb upon the branch of a tree, and is not suited for agriculture. Its wax collected by natives in the forests is, however, an article of trade and of fairly good quality but usually very yellow.

Spices.—These were hardly as good as we remember to have seen in byegone shows. There were, however, fourteen exhibits of dry nutmegs, some of which were decidedly good, and twelve samples of fresh nutmegs in the husk. The best of the nutmegs competing, however, were not to be compared with the sample of Banda nutmegs shown by Mr. Diepenheim, which of course are a very much larger class of nutmeg than those we usually get from the Peninsula.

Cloves were fairly good but many better samples have been staged at the earlier shows, and there were only ten exhibits.

Mace both red and yellow were of fairly good quality taken all round, and some of the red mace was quite superior.

Collections of spices for curries were represented by five exhibits, some of which were very complete in the number of kinds of spices shown. They were in some cases too very nicely put up, but there was a tendency to give very small samples of each kind of spice.

Some excellent samples of *Curry Powder* of a very special make were shown by Watt Lee & Co.

Pepper.—Both black and white was fairly well shown, and some of the samples were first class. But the number of exhibits was not as large as in the former days when pepper was so largely cultivated. There were many fine examples of white pepper which were disqualified owing to their having been grown outside our area.

Ginger and *Turmeric.*—Were both good and abundantly shown. The turmeric, however, was mostly rather small in the rhizome. The Ginger was good, and some of large size. Both in these classes and in that of arrowroot, some exhibitors have a tendency to send their samples unwashed and coated with mud. Although this does not necessarily count as a point against the exhibit, yet it detracts from the appearance of the sample and is a distinct defect in staging.

Patchouli was well represented. A larger number of exhibits being staged than on previous occasions. Kamuning Estate came well to the front again with some beautifully prepared leaves, and there were other good samples, but some of those shown were too full of stalk.

Tuba root was shown in very extensive series, with roots of all sizes and forms. They were all fair to good and formed a difficult class to judge. Among them several natives showed "a new Tuba root" which appeared to be the stems of *Tinospora cordifolia.*

Dammars.—Were more abundantly shown than on the last occasion and some masses were very large. There was a good variety in the collections, but they were chiefly of the Damar daging type, and of other dark resins. A fine series of Moluccan damars was shown by Mr. Diepenheim. These further eastern damars known mostly as copals in local trade are the most in demand in Europe, being clearer in colour than most of the local ones of the Peninsula.

Rattans.—The collections of rattans were decidedly above the average of those seen at previous shows and they were also more plentiful. Messrs. Tan Ah Choon exhibited some beautifully prepared Borneo canes, which were awarded a diploma for their careful preparation, though not being produced within the limits of the Peninsula, and being of two varieties only they could not enter for competition with the collections of jungle canes.

Bamboos.—Collections of samples of these were numerous, and there were some good specimens. The curious branched culms, and flexuous culms and other abnormal specimens were as abundant as usual.

Walking-sticks.—Though the prize for these is offered for sticks unfinished and unmounted far the greater part were highly worked up and ornamented. The collection was much larger than on previous occasions and some of the sticks were really very fine, and they were much in demand by purchasers. It would, however, perhaps be preferable in future, considering that most are works of art, to transfer this class to native industries.

Rice, paddy, and pulut formed a large feature in the exhibition but it must be admitted that the collection as a whole was not as large as we have seen on other occasions. There were several collections for the Mukim prize in which were over fifty varieties, the finest lot containing seventy-two named kinds. Cooked rice was not shown, and as this has commonly happened before, perhaps it would be as well to omit this class in future from the exhibitions. As is usual some of the Malay penghulus were called in to aid in judging the rice and paddy exhibits, but even with their aid the work of examining all the exhibits and judging of their respective merits took the judges a long time.

Tapioca roots were quite up to the average though not as fine as those shown at Penang show, but Tapioca roots are cumbrous things to travel with and the greater distance from the big tapioca culture area is perhaps the reason why fewer large specimens were sent.

Tapioca Flour.—There were a number of good exhibits.

Five or six samples were very near one another in quality and it was difficult to decide which was the better of the two chosen as leaders.

Flake.—There were very few exhibits of really good quality.

The exhibits from Malacca were rather disappointing, and were certainly not as good as those shown at the Kuala Lumpur Exhibition.

The sample that was far and away the best in this class was exhibit No. 599, made we believe at the Malakoff Estate, Province Wellesley.

The same exhibitor shewed a fine specimen of flake siftings the make of which was exceedingly regular.

Pearl.—There were some nice exhibits of Medium Pearl but we only saw one good sample of seed.

Sago Pearl.—There was only one exhibitor in this section, Messrs. Brinkmann & Co., and the samples shewn were well made and of good colour and quality.

Flour.—The two or three exhibits presented nothing special in the way of quality.

Maize was exceptionally good this year, the cobs shown being mostly large and well-filled, but there was practically only one variety shown.

Biscuits.—A number of specimens of local made biscuits were shown by Messrs. Ho Ho. No prize was offered for competition in products of the bakery.

Soap.—A prize was offered by Dr. Lim Boon Keng for the best locally made soap. Unfortunately the offer came after the printing of the schedule of prizes so that there was no possibility of informing the local manufacturers of this article that there would be a prize offered. A Chinese firm, Messrs. Hock Leong, however, brought some excellent samples of this and obtained a medal. The same firm exhibited also a number of sweets, manufactured by themselves.

Dried fish, locally prepared.—Was also the subject of a prize offered by Dr. Lim Boon Keng, unfortunately too late to get a competition, and none was shown.

Wet Gambier.—There were only three exhibits of this important local produce.

The prize winner was the only fair sample shewn, while that exhibited by the "Gambier Society" was distinctly poor.

In view of the importance of the export trade in this article it would have been more interesting had there been shewn examples of the product in its various stages of manufacture—from the green leaf to the final block.

Cube Gambier.—The exhibits in this section were generally good although some looked as if they had been prepared specially for exhibition purposes.

Gambier Extract.—This was an interesting sample of what looked like Gambier-dust, prepared evidently by some process of crushing the dried gambier extract into very small flakes.

In this state the gambier should be in the most suitable form for export. The only objection we saw to this process was the tendency of the "dust" to become caked by contact with moist atmosphere, but this might be obviated if the stuff were packed in air-tight cases.

Indigo.—There were a number of bottles of this dye both liquid and in powder, than at recent private exhibitions, and the quality was decidedly better than at the last exhibition. This indeed might have been expected in Singapore where the dyeing business has by no means died out yet. The samples varied a good deal in quality and one bottle contained liquid of a remarkably brilliant and attractive blue colour which however unfortunately was not indigo-colour.

Cutch.—A sample of the Mangrove cutch made at Santubong in Sarawak was shown. Great improvements in this manufacture have been made in late years, with a corresponding increase in demand.

The Governor's Cup for the best general exhibit in the agricultural section was easily won by Mr. Machado of Kamuning Estate, Perak, who made a good try for it at the last year's show. He took eleven prizes in all, viz., first prize for best collection of essential oils, best sample of patchouli, best collection of medicinal plants, best collection of fibres, best cotton, best kapok, best dried betel-nuts, second prize for best black pepper, best arrowroot, best limes, and third prize for turmeric.

On the whole it may be said that the agricultural produce was very good and representative of the products of the Malay Peninsula, very few of the classes in the schedule were not represented and these consisted only of boiled rice, and clove oil.

At the same time it must be admitted that some classes were not as well represented as in previous exhibitions.

Vegetables.—The exhibition of vegetables was equally poor, probably because the chief vegetable growers, the Chinese, did not understand what the exhibition was about. The idea is utterly foreign to them, and the vegetable-growing class, in spite of explanations, notices in Chinese, etc., failed to send samples of their produce. Mr. Campbell sent from Perak Hills a grand collection of European vegetables as he did last year, with several novelties. Perhaps a time may come when our hills will afford a good supply of European vegetables to the dwellers in the plains. Many of the hills could be opened up for vegetable gardens and the produce brought down and shipped to the larger towns. Mr. Campbell has shown clearly that the vegetables can be grown well and can be brought to Singapore in prime condition. That they were highly appreciated was shown by the run on his exhibit at the end of the show. The supply of wholesome and good European vegetables to residents would go a good way in hygienic improvement of the European's life.

Fruit.—Was again not up to standard. Last year the show held in Penang was not as good as it might have been because much of the fruit was not ripe. This year the exhibition was put a little later, and unfortunately the great crop was nearly over. In Singapore at least for several seasons the fruit crops have been very inferior, and the supply has not been what it was in former years. This may be due to peculiarly unsuitable weather, or it may be due to the ageing of the old trees planted many years ago and now dying out not having been replaced by younger plants.

The greater number of the prizes were taken in this section by Malacca, Johore, Perak and Selangor.

No specimens of Binjai, Langsats or mangos were shown.

In the same shed were staged the table decorations and cut flowers, the honey, and the eggs, and also the preserves. In these latter there was a great improvement, chutneys, jellies, preserved fruits, curry powders, pickles and sweetmeats were well staged in abundance and very good were the samples.

FLOWERS AND FLOWERING PLANTS.

The exhibition of horticulture was distinctly disappointing, what was shown was in many cases good but when one remembers the splendid exhibitions in years gone by, one cannot but feel that a very great deal of the early enthusiasm for gardening in Singapore has disappeared. Some of the old exhibitors whose gardens were a pleasure to see have long gone from us and their plants have been dispersed, others are still with us and showed what they had, but we missed the great masses of Heliconias, Selaginellas, and ferns, Marantas, Crotons and still more perhaps the flowering-plants. The cause of this is perhaps the more frequent home-going of the Europeans. The ordinary resident goes home and auctions all his property including his plants. He does not care to furnish his house well on his return because he may go home again in a few years, so he just gets a few common things to fill up the verandah, and leaves their care to the kebun.

We have unfortunately not received any report of the exhibition in this class from the judges. Some good palms were shown, among them a very fine *Martinezia erosa*, shown by Mr. Down, some fine clumps of *Chrysalidocarpus lutescens* by the proprietors of the Raffles Hotel.

A few good orchids were shown, including a fine *Cattleya*.

Mr. Choa Kim Keat showed a very nice lot of succulents, the dwarf cacti being remarkably good.

Mr. Seah Liang Seah showed a number of quaint contorted trees over eighty years' old.

In many of the classes there was no second prize awarded and there was no award given for coleus, six crotons, panax, selaginellas, best specimen foliage plant, achimenes, amaryllis, asters, balsams, three cannas, dianthus, eucharis, gloxinias, three roses, zinnias, collection of flowering plants, cut asters, chrysanthemums, dahlias, roses, hand bouquet, or wild flowers arranged for effect. Table decorations were entered for by several ladies, and Mrs. Down carried off the first prize with a neat decoration of purple and white cosmos, very light and pretty. Mlle. de Gaspery was second with yellow cosmos (Klondyke) and grasses, Mrs. Aptroot showed a very much more elaborate and design of arches in asparagus which, though a little too large for the table, was good and light in style.

Except some fine palms from Mr. Chesney Duncan in Penang, all the exhibits in this section were from Singapore, the distance from the Native States and the journey by sea preventing its being possible to bring down flowers in good condition. Mr. Choa Kim Keat, one of our most enthusiastic horticulturists, carried away a large proportion of prizes, and his exhibits formed a large feature of the exhibition.

The thanks of the Committee for the excellent exhibition in these sections was due to the District Officers of the Malay States and colony who did not spare any labour in getting the natives to send in specimens, and in selecting that was worthy of being sent to the exhibition. Among those who were specially energetic should be mentioned, Mr. Peel, Mr. Firmstone, Mr. Chevallier, Mr. Laidlaw, Mr. Campbell, Mr. Simmonds, Mr. Main and the Residents and Resident Councillors. For the school exhibits the excellent result was due to Mr. Collinge. Rajah Hitam Nongchie did good work both in collecting funds and an excellent series of exhibits from Johore States.

Rubber.—There was really a very good exhibition of rubber of all kinds and forms, mostly as might be expected from the European estates, but there was already some shown by natives. There were 18 entries in Rambong sheets and ball mostly from Perak and Selangor there being only one entry from Singapore and one from Penang. Considering Rambong is a more recent industry than Para the exhibits were fairly representative.

There was a fine display of Para in the various forms of biscuits, sheets, crepe, worm and scrap. Few of the biscuits or sheets however were thoroughly dry, a point all exhibitors should remember, as an exhibit for competition should, whatever class exhibited, be in perfect condition. Undoubtedly deserving of pride of place were the blocks exhibited by Mr. F. Pears of Muar, and the high price recently obtained on the London market for this rubber emphasises the favourable opinion formed at the local show of this form of preparation. In biscuits the first prize fell to Kamuning Estate, Perak, and a diploma to the Highlands and Lowlands, Selangor, there were also some very fine native exhibits in this class.

The first prize and diploma for crepe went to Lanadron Estate (Mr. F. Pears) while Highland and Lowlands and Kent Estates were highly commended.

Para sheets were well contested, the first prize being secured by the Highlands and Lowlands Estate, Selangor, and the second prize went to Pataling Estate. Mr. Bird of Kuala Kangsar, Perak, obtained a diploma for a sample of excellent sheets which seemed perfect. The Penang Sugar Estates were highly commended. Altogether there were 15 entries in this class.

In the class "other preparation" which included Mr. Pears blocks there were 19 entries. The diploma for rubber and highest prize going, as said before, to Mr. Pears, but a first prize was awarded to Bertams Estate, a diploma to Highlands and Lowlands, and Yan Seng, Perak, highly commended for long carpet-amber coloured sheets. In this class there were also several other interesting exhibits.

Class 60, Para-general exhibit, packed in boxes as sent from estate for export included 10 entries of 17 boxes of different preparation, the diploma and cup being carried off by Lanadron (Mr. Pears) the advantage of this preparation as a simple and cheap means of transport being obvious. The second prize going to Vallambrosa Estate, Selangor, who exhibited some splendid rubber but did not meet with usual luck.

Several sets of photographs of estates and methods of tapping were shown by Mr. Campbell and Mr. Douglas and others.

Para rubber seeds were shown though there was no class for them.

Among apparatus use for cultivation and preparation of rubber may be mentioned a large series of rubber tools exhibited by McAlister & Co.

A working plan of a rubber dryer by means of desiccated air was exhibited by Mr. Swan, which may prove an useful adjunct to the planter.

Mr. P. T. Burgess showed an ingenious and very simple girth-measurer, by means of which any cooly can take the measurements of all the trees in an estate in a very short space of time, so as to give a correct idea of the extent of tapping area in an estate. A description of this simple apparatus is promised for the Bulletin.

Class 51.—Rambong Sheets.

No.	Exhibitor.	Description of Exhibits.	Awards.
‡2072.	Highlands and Lowlands.	Latex, Crepe sheets†	1st Prize.
‡ ,,	Highlands and Lowlands.	Dark, Crepe sheets†	
‡ ,,	,, ,,	Block	Diploma.
‡2973.	Golden Hope.	Crepe, grey†	
‡ ,,	,,	Red †	
‡ ,,	,,	Block-sheets†	
1794.	Haj. Md. Ali Yasin Sitiawan.	Block-sheets	
1789.	,, ,, ,,	,,	
218.	,, ,, ,,	Pale sheets	

Class 53.—Rambong Ball.

No.	Exhibitor.	Description of Exhibits.	Awards.
‡2072.	Highlands and Lowlands.	Ball, big†	1st Prize.
1829.	Tan Keong Lenggong.	Block.	
570.	Khow Boon Hong, N. Tebal.	Lumps.	
202.	Seet Kee Ann, Singapore.	Blocks.	
1789.	Haj. Mhd. Ali, Sitiawan.	Ball.	
‡1500.	Kamuning.	Lumps.	
1503.	Ismail, Upper Perak.	Block.	
‡2599.	C. M. Cumming.	Crepe, grey and red.	
568.	Penang Sugar Estates Co.	Ball.	

Class 53a.—Para Sheets.

No.	Exhibitor.	Description of Exhibits.	Awards.
1789.	Haj. Mhd. Ali, Sitiawan.	Pale thin sheets.	
558.	Bertam Estate.	Brown medium.	
‡1501.	Yam Seng	do.	
‡1814.	Plang Estate	do.	

Class 53a.—Para Sheets—(*cont.*)

No.	Exhibitor.	Description of Exhibits.	Awards.
79.	H. E. James, Kota Tinggi, Johore.	Dark Medium.	
‡2502.	New Labu Estate.	Pale scored.	
568.	Penang Sugar Estates.	Brown Medium	Highly Com.
1521.	G. F. Bird, K. Kangsar.	Pale Medium†	Diploma.
,,	,,	,, Thin†	
‡1500.	Kamuning.	Pale Medium†	
‡1501.	Yam Seng.	Brown Medium†	
‡2057.	Devon.	Pale Medium Sheets†	
‡2072.	Highlands and Lowlands.	Brown Scored Sheets†	1st Prize.
570.	Khow Boon Teng N. Tebal.	Dark Medium Sheets.	
‡ 11.	Sandycroft.	Thin sheets amber.	
‡2058.	Petaling.	Brown Medium Scored.	2nd Prize

Class 54.—Para Biscuits.

‡1501.	Yam Seng.	Large brown thin round.	
‡2062.	Vallambrosa.	Dark Medium Round.	
70.	H. E. James, Kota Tinggi, Johore.	Dark Medium Round.	
203.	Haj. Hassain Pengerram.	Thick Yellow.	
‡2057.	Devon.	Pale thin†	
‡2072.	Highlands and Lowlands.	Diamond dark Square†	Diploma.
‡1594.	U. C. Thambol K. Kangsar.	Pale Medium Oblong.	
‡1500.	Kamuning.	Pale Medium round†	1st Prize.
‡2501.	Seremban.	Black round.	
‡2069.	Haron.	Pale Medium Round.	

Class 55.—Para Crepe.

‡2501.	Seremban Estate.	Pale Crepe.	
‡2501.	Seremban Estate.	Dark Crepe.	
‡2073.	Golden Hope.	Medium Crepe†	
‡2062.	Vallambrosa.	Pale Crepe.	
‡2072.	H. & Lowlands.	Grey Crepe†	Highly Commended.
‡2095.	Kent.	Palest Crepe†	Highly Commended.
‡2095.	Kent.	Darkish Crepe†	
‡ 23.	Lanadron.	Pale Crepe†	Diploma and 1st Prize.
‡ 23.	Lanadron.	Reddish Crepe†	
‡2058.	Petaling.	Pale Crepe†	

Class 57.—Para Worm.

1789.	Haj. Md. Ali Sitiawan		

Class 58—Para (*other preparations*).

218	Haj. Md. Ali, S'tiawan.	Pale Crepe wet.	
‡2599.	C. M. Cumming.	Red Medium Sheets smoked.	
203.	Haj. Hussain Pengaram.	Pale Medium Biscuits.	
‡2072.	H. & Lowland.	Dark Thin Biscuits spare†	
‡ 23.	Lanadron.	Block†	Diploma and 1st Prize.
‡1501.	Yam Seng.	Carpet, Amber,	Highly Commended.

Class 59.—Para Scrap.

No.	Exhibitor.	Description of Exhibits.	Awards.
‡1521.	G. F. Bird, K. Kangsar.	Ball†	
‡ 11.	Sandycroft.	Lump.	
‡2095.	Kent.	Dark Crepe†	
‡2057.	Sione.	Pressed Scrap†	
‡2072.	Highlands and Lowlands.	Dark Crepe†	
‡2072.	,, ,,	Block†	Diploma.
570.	Khow Boon Teng, N. Tebal.	Loose unpressed.	
1789.	Haj. Mhd. Ali, Sitiwan.	Ball	
1789.	,, ,,	Sheets, yellow.	
202.	Seet Kee Ann, Singapore.	,,	
218.	Haj. Mhd. Ali, Perak.	Biscuits, yellow.	
‡2058.	Petaling.	Grey Crepe†	
558.	Bertam Estate.	Loose unpressed	1st Prize.

Class 60.—Para General Exhibits.

‡ 23.	Lanadron.	Crepe†	
‡ 23.	,,	Block†	Diploma and 1st Prize.
‡ 11.	Sandycroft.	Amber Medium Sheets†	
‡1500.	Kamuning.	Thin Pale Sheets†	
558.	Bertam Estate.	Dark Medium Sheets.	
1521.	F. G. Bird, K. Kangsar.	Pale Medium Sheets.	
‡1521.	Vallambrosa.	1 box pale scored sheets 1 ,, dark ,, ,, 1 ,, yellow crepe ,, 1 ,, dark ,, ,, 1 ,, beack ,, ,, †	2nd Prize.
‡2073.	Golden Hope.	Pale Crepe†	
‡2072.	Highlands & Lowlands.	1 box pale scored sheets 2 ,, dark crepe ,, 1 ,, pale ,, ,, 1 ,, Rambong Crepe †	
‡2069.	Haron.	1 box pale sheets and scrap.	

Special Class.

203.	Haj. Hussain Pegaran.	Para Seeds	
‡2057.	Sione.	,,	
‡2095.	Kent.	,,	

Not for Competition.

Singapore Botanical Gardens	Pale Sheets. Pale Biscuits. 1 bale 72 lbs.—Scrap.

‡*Photos.* From Linsum

Rubber Dryer (with dessicated air) by W. R. Swan working plan.

Girth Measurer by P. J. Burgess.

H. N. R.

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‡Members of the U. P. A. †Forwarded to Ceylon Show.

POULTRY.

As a whole there was a poor show of poultry, only about 50 pens were shown. Two pens of six—Buff, Orpingtons and Minorcas.

The Orpington winners were a fair average lot, the cock on the small side but the hens were better. The Minorcas, good birds otherwise, failed lamentably in their legs—all were feathered. The Orpingtons were prize winners at Penang also in 1905.

The best pair in the show were a Malay game cock and hen, really good specimens and were easily the best birds in the show.

Two pairs of Brahmas were shown. If the winning cock and losing hen had been placed together it would have been a very fine pair. Brahmas do not do well in this damp climate and their plumage is very much affected. Crossed with or by Malay local game, they should do well, as a pure bird they are disappointing.

Of turkeys only two pair were shown and poor ones at that.

Geese a fair number, but poor and stunted in appearance—only one good and shapely bird amongst the lot.

One pair of indifferent Guinea fowl. Two pair of Victoria pigeon were shown, very handsome birds and easily kept in captivity.

The jungle fowl shown was a very scraggy lot and the hens did not strike one as being jungle hens at all, very few were exhibited.

It is an extraordinary thing how many persons think that an agri-horticultural show is an offshoot of Barnum's and any freak or dime-museum monstrosity should find a place in it.

It is a great pity that more interest is not taken in this class of produce—it affects everyone of us and should have better attention paid to it. Poultry repay interest taken in them, but it must be whole-hearted. Natives showed hardly any poultry although they took considerable interest in the exhibition.

A few pigeons and canaries were exhibited, none of any very great interest.

Cats.—There were not as many cats shown as might have been expected. There were a few good Persians, notably Mrs. Daly's grey Persian, a beautiful animal which had taken prizes at shows in England. Only three Siamese cats were shown but these were fairly good. English cats were not particularly striking.

Cage birds.—There was little very striking in this class, a few good parrots, and some canaries, and some birds of paradise. Mr. Lim Lee carried off a first prize with a very beautiful small bird, black with an orange breast and a long tail. There were also a good many Java sparrows of various colours shown.

Rabbits and guinea pigs were poorly shown, though there are many rabbits of good class kept in Singapore and the exhibition might have been better.—C. HAWTREY.

NATIVE INDUSTRIES.

The total number of entries, of which there are records, comes to about 1,000, allowing 50 for the Negri Sembilan and Singapore, the latter contributing very little indeed. Of these I find that 575 came from Perak, 83 from Selangor, 126 from Penang, and 167 from

Malacca. These figures show to what extent this Division was indebted to Perak for its exhibits. In embroidery alone Perak exhibited 35 specimens mostly of very fine work, two first prizes being awarded to entries from Kuala Kangsa, and Papan. Two second prizes were awarded to exhibits from Malacca, which sent 20 entries, and was the only country approaching Perak in this class. Other headings under which Perak exhibited largely were ornamental baskets, 22 entries, rope and twine, attaps, mats and serih sets. Models were very numerous. Of the model snares and traps 38 specimens came from Perak, very few indeed coming from elsewhere. Of the old silver-work practically the whole came from Perak (18 entries) and Selangor (7 entries) but the first prize was awarded to some new work by a Singapore silversmith. Under brass-ware nearly all the entries were from Perak, although a Penang exhibitor secured the first prize. For ornamental baskets 5 prizes were awarded, all going to the Malacca exhibitors. The tin-ware from Seremban was as usual a very conspicuous exhibit. The Malacca lace workers also attracted much attention, as did the sarong-weavers, and the Chinese drawn thread workers. There were some very handsome old kriss-sheaths shown, but in this, as in other cases, the preference was given to new work, the first prize going to a Butterworth exhibit. The latter part of the prize list, from 307 to 314, calls for no remarks, the prize-list which is in your hands showing the results. Class II (school-exhibits) was separately managed and judged. I enclose a few notes on matters of organisation, arrangement of the prize-list, etc., which may be of use in future shows. Thanks are due to Messrs. Coutts and Marriott for the great assistance rendered by them in the work of this Division.

G. A. HALL,
Honorary Secretary, Division E.

PRIZES AWARDED AT THE SINGAPORE AGRI-HORTICULTURAL SHOW 1906.

Division A.—Agricultural Produce.

Class No.	Exhibit No.	Amount $
1.—Arrow-root fresh :—		
1st Prize, H. H. Norris, Singapore	1	5
2nd ,, A. D. Machado, Kamuning Estate, Perak	1500	2
3rd ,, Hadji Mohamud Yassim, Perak	1794	1
Special Prize, Din Bin Brahim, Pajak Song, Penang	597	1
2.—Arrow-root, prepared :—		
1st Prize, Penang Sugar Estate, Penang	568	5
2nd ,, Girls School, S. P. G. Mission, Singapore	9	2
3rd ,, Mohamud Kassim, Penang	505	1
3.—Bamboos :—		
1st Prize, Hadji Mohamud Ali, Perak	1790	5
2nd ,, Penang Sugar Estate, Penang	568	2
3rd ,, Wan Mohamud Nasie Bukit Gantang, Perak	1804	1

Class No.		Exhibit No.	Amount. $
4.—Betel Nuts, fresh :—			
	1st Prize, Mohamud Noh Lower, Perak	1779	3
	2nd ,, Kader Khan, Singapore	107	2
	3rd ,, Inche Abdul Rahman, Batu Pahat	133	1
5.—Betel Nuts, split and dried :—			
	1st Prize, A. D. Machado, Perak	1500	5
	2nd ,, Penghulu Abdul Wahab, Perak	1524	2
	3rd ,, Hadji Mohamud Yassin, Perak	1794	1
6.—Cloves :—			
	1st Prize, S. M. Peralta, Malacca	1033	10
	2nd ,, Mohamud Zain, Penang	548	5
	3rd ,, Hadji Mohamud Yassin, Perak	1794	2
7.—Coconuts unhusked :—			
	1st Prize, Rasit Kuala Kangsar, Perak	1598	7
	2nd ,, Ng Ah Soo, Singapore	21	3
	3rd ,, Penghulu Hadji A. Majid, Merlimau, Malacca	1105	1
8.—Coconuts, husked :—			
	1st Prize, Penghulu H. Aminudin, Sungei Tinggi, Perak	1523	7
	2nd Prize, E. R. Salisbury, Gapis Estate, Perak	1520	3
	3rd ,, Hadji Maali B. H. Ismai, Tanjong Kling, Malacca	1025	1
9.—Coconuts, best collection :—			
	1st Prize, Hadji Mohamud Yassin, Perak, Durian S'tiawan, Perak		10
	2nd Prize, E. B. Prior, Golden Hope Estate, Klang	2073	5
	3rd Prize, Latip Bin Eusope, Keluban Besar, Malacca	1019	2
10.—Copra, sun-dried :—			
	1st Prize, E. B. Prior, Klang	2073	5
	2nd ,, Penang Sugar, Estate	568	3
	3rd ,, Kanday Penang	532	1
11.—Copra, kiln dried :—			
	1st Prize, E. B. Prior, Klang	2073	5
	2nd ,, Kader Khan, Singapore	107	3
	3rd ,, Penghulu H. A. Majid, Malacca	1105	1
12.—Cotton "Kapok" :—			
	1st Prize, A. D. Machado, Perak	1500	5
	2nd ,, Said Yusope, Kuala Kangsa, Perak	1533	3
	3rd ,, Mohamud Zain, Penang	521	1
	Highly Commended, Inche Din, Penang		
13.—Cotton "Kapas" :—			
	1st Prize, A D. Machado, Perak	1500	10
	2nd ,, D. Logan, Penang	607	5
	3rd ,, Mohamud Mansoor, Perak	1792	2
14.—Cocoa :—			
	1st Prize, Samiah, Ampangan, Negri Sembilan	2572	5
	2nd ,, Hadji Mohamud Akḥir, Ampangan, N. S.	2563	3

Class No.	Exhibit No.	Amount. $
15.—Coffee Liberian :—		
1st Prize, E. B. Prior, Klang	2073	
2nd ,, A. D. Machado, Kamuning	1500	5
3rd ,, O. Pfenningwerth, Klang	2072	2
16.—Coffee variety :—		
1st Prize, O. Pfenningwerth, Klang	2072	5
2nd ,, E. B. Prior, Klang	2073	3
3rd ,, Sd. Hussain, Penang	600	1
H. C., Nyak Ah Yum, Penang	560	
17.—Dragons Blood :—		
1st Prize, Hussain, Perak	1831	5
2nd ,, Penghulu Raja Shabudin, Perak	1525	3
3rd ,, Penghulu Hadji Aminudin, Perak	1523	1
18.—Fibres :—		
1st Prize, A. D. Machado, Kamuning Estate	1500	15
2nd ,, Syed Ahmad, Penang	512	7
3rd ,, K. Hamad, Penang	518	2
19.—Gambier :—		
1st Prize, Inche Hamzah Bin Awang, Muar	148	5
2nd ,,	1011	3
3rd ,, Sandycroft Rubber Coy.	11	1
Extra Prize.—The Lanadron Estate, Muar	23	1
20.—Getahs :—		
1st Prize, O. Pfenningwerth, Klang	2072	10
2nd ,, Datu Luar, Batu, Pahat	136	5
3rd ,, H. Berkeley, Upper Perak	1502	2
21.—Gums and Dammars :—		
1st Prize, District Officer, Kuantan, Pahang	207	7
2nd ,, Orang Kaya Jaffar, Batu Pahat	137	3
3rd ,, Hadji Mohamud Ali Perduka Raja, Perak	1790	1
22.—Ginger :—		
1st Prize, Andi, Penang	532	5
2nd ,, Penghulu Sam Bin Salleh, Batu Berendam, Malacca	1014	3
3rd Prize, R. W. Munro, Kuala Langat, Selangor	219	1
23.—Indigo :—		
1st Prize, Yeop Ibrahim, Perak	1834	5
2nd ,, Abu Bakar, Klang	2068	3
3rd ,, Penang Sugar Estate, Penang	568	1
24.—Mace, yellow :—		
1st Prize, Hadji Hussin, Singapore	203	5
25.—Mace, red :—		
1st Prize, Seet Kee Ann, Singapore	202	5
2nd ,, Hadji Hussin, Singapore	203	3
3rd ,, O. Pfenningwerth, Perak	2072	1
26.—Maize :—		
1st Prize, Omar, Perak	1540	5
2nd ,, Penghulu Saman, Perak	1512	3
3rd ,, Mohamud Mansoor, Perak	1792	1

Class No.	Exhibit No.	Amount. $
27.—Medicinal plants :—		
1st Prize, A. D. Machado, Perak	1500	10
2nd ,, Hamid Fasir, Perak	1793	5
3rd ,, Mohamud Kassim, Penang	505	2
28.—Nutmegs, fresh :—		
1st Prize, Seet Kee Ann, Singapore	202	5
2nd ,, Hadji Mohamud Yassin, Perak	1794	3
3rd ,, Kulop Mohamud, Perak	1570	1
29.—Nutmegs, dried :—		
1st Prize, Mohamud Kassim, Penang	505	10
2nd ,, Andi, Penang	532	5
3rd ,, Hadji Hussin, Singapore	203	2
30.—Oil, citronella :—		
1st Prize, A. C. Hardouin, Penang	582	Medal
2nd ,, Alexander Smith, Perak	1805	5
3rd ,, Teban Louise Estate, Tampenis, Singapore	4	2
31.—Oil, lemon grass :—		
1st Prize, A. C. Hardouin, Penang	582	Medal
2nd ,, Alexander Smith, Perak	1805	5
32.—Oil, coconut :—		
1st Prize, Singapore Oil Mills	123	Medal
2nd ,, L. S. Aeria, Penang	591	5
3rd ,, K. Hamad, Penang	518	2
H. C., Mohamud Arashad, Penang	513	
33.—Oil, teel seed :—		
1st Prize, Che Din, Penang	521	5
2nd ,, Serat B. H. Habib, Penang	592	3
3rd ,, Odain, Penang	519	1
34.—Oil, castor :—		
No award.		
35.—Oil, Para Rubber		
1st Prize, H. F. Dupois, Negri Sembilan	2502	5
2nd ,, Singapore Oil Mills, Singapore	123	3
36.—Oil, clove :—		
No award.		
37.—Oil Cake :—		
1st Prize, Singapore Oil Mills	123	5
H. C., G. Frankland, Singapore	208	
38.—Oil, collection :—		
1st Prize, A. D. Machado, Perak	1500	10
39.—Pepper white.—Li Ah Pow, Thaiping, Perak	40	10
2nd Prize, E. R. Salisbury, Perak	1520	5
3rd ,, Low Kong Yeo, Klang	2082	2
40.—Pepper black :—		
1st Prize, E. R. Salisbury, Perak	1520	10
2nd ,, A. D. Machado, Perak	1500	5
3rd ,, Asst. Penghulu Abdul Wahab, Perak	1524	2

Class No.	Exhibit No.	Amount. $
41.—Patchouli:—		
1st Prize, A. D. Machado, Perak	1500	5
2nd ,, Penghulu Abdul Wahab, Perak	1524	3
3rd ,, Lanadron Estate, Muar	23	1
42.—Padi variety (1st Prize, presented by Hon. J. K. Birch):—		
1st Prize, Mat Drum, Upper Perak	1504	25
2nd ,, Penghulu Pandak Abdulla, Bagan Serai, Perak	1840	10
3rd Prize, Kulop Mohamud, Senggang, Kuala Kangsar, Perak	1570	5
43.—Padi Collection:—		
1st Prize, Penghulu Pandak Abdulla, Perak	1840	50
2nd ,, Penghulu Ijok, Perak	1842	25
3rd ,, Kulop Mohamud, Perak	1570	10
H. C., Penghulu Meor Jaya, Lenggong, Upper Perak	1821	
44.—Pulot sample:—		
Penghulu Pandak Ibrahim, Kuala Kurau, Perak	1839	5
2nd Prize, Kulop Mohamud, Kuala Kangsar, Perak	1570	3
3rd ,, Bahari B. Panchor, Province Wellesley	585	1
45.—Pulot varieties:—		
1st Prize, Penghulu Pandak Ibrahim, Kuala Kurau, Perak	1839	7
2nd Prize, Penghulu Puteh Matkief, Briah. Krian, Perak	1841	3
3rd Prize, Penghulu, Ijok, Perak	1842	1
46.—Rice prepared by Machinery:—		
1st Prize, Mudin Bin Sulong, Jasin, Malacca	1102	10
47.—Rice prepared by pounding:—		
1st Prize, Penghulu Masop Bin Hussin, Bachang, C. Dist., Malacca	1002	10
2nd Prize, Kung Theam Seng, Survey Office Penang	511	5
3rd Prize, Penghulu Hadji Abu Bin Ujong, Jasin, Malacca	1142	3
48.—Rice Collection:—		
1st Prize, H. Berkeley, Upper Perak	1502	10
2nd ,, Hasib, Jaffar, Kampong Bouia, K. Kangsar, Perak	1622	5
3rd Prize, Ujah Ahmad, Saiong, Kuala Kangsar, Perak	1584	3
49.—Rice, boiled:—		
No award.		
50.—Rotans:—		
1st Prize, Hadji Mohamud Salley, Johore	154	5
2nd ,, Syed Bin Kulop, Malacca	1144	3
3rd ,, Hadji Mohamud Alley Peduka Raja, Perak	1790	1
H. C., Tan Ah Choon, Singapore	52	

Class No.		Exhibit No.	Amount. $
51.—Rubber (Rambong) Sheets :—			
	O. Pfenningwerth, Klang. A Cup presented by United Planter's Association, Negri Sembilan	2072	
52.—Rubber (Rambong) Biscuits :—			
	No award.		
53.—Rubber (Rambong) Ball :—			
	O. Pfenningwerth, Klang	2072	10
53. (*a.*)—Rubber (Para) Sheets :—			
	1st Prize, O. Pfenningwerth, Klang. A Cup presented by Hon. W. J. Napier	2072	
	2nd Prize, The Pataling Rubber Estate Coy., Kuala Lumpur	2058	Medal
54.—Rubber (Para) Biscuits :—			
	1st Prize, Kamuning Estate (A. D. Machado), Perak. A Cup presented by Hon. Tan Jaik Kim	1500	
	H. C., O. Pfenningwerth, Klang	2072	
55.—Rubber (Para) Crepe :—			
	1st Prize, Lanadron Estate, Muar. A Cup presented by United Planter's Association, Selangor	23	
	H. C., H. M. Darby, Vallambrosa Estate, Klang	2062	
56.—Rubber (Para) Lace :—			
	No award.		
57.—Rubber (Para) Worm :—			
	No award.		
58.—Rubber (Para) any other preparation :—			
	1st Prize, Lanadron Estate, Muar	23	Medal
59.—Rubber (Para) Scrap :—			
	Penang Sugar Estate. A Cup presented by United Planter's Association, Selangor	558	
60.—Rubber (Para) Packed :—			
	1st Prize, Lanadron Estate, Muar. A Cup presented by H. N. Ridley, Esq.	23	
	2nd Prize, H. M. Darby, Klang	2062	10
61.—Rum Sample :—			
	1st Prize, Thomas Berja, Perak	1838	10
62.—Rum shrub :—			
	1st Prize, Penang Sugar Estate, Penang	568	60
63.—Sago pearl :—			
	1st Prize, Messrs. Brinkmann & Co., Singapore	73	Medal
64.—Sago flour :—			
	1st Prize, Dindang Sauh, Malacca	1052	10
65.—Sireh :—			
	1st Prize, Jaffar Bin Awang, Malacca	1114	5
	2nd ,, Ali Bin Amin, Malacca	1022	3
	3rd ,, Baba Bin Rasit, Malacca	1030	1
66.—Spices :—			
	1st Prize, Sd. Hussain, Penang	600	10
	2nd ,, Nayak Ah Yum, Penang	560	3

Class No.	Exhibit No.	Amount $
67.—Sugar Cane :—		
1st Prize, H. H. Norris, Singapore	1	Medal
2nd ,, Hadji Leman Bin Hadji Hussain, Malacca	1024	5
68.—Sugar Cane varieties :—		
1st Prize, Penang Sugar Estate, Penang	568	Medal
2nd ,, Mohamud Kassim, Klang	2070	5
69.—Sugar (coconut) :—		
1st Prize, Inche Indot Bin Tanjong, Batu Pahat	142	5
2nd ,, Hadji Mat Ali Bin Hadji Ismail, Malacca	1025	3
3rd ,, Saidin Bin Mahat, Selangor	2052	1
H. C., Syed Ahmed, Selangor	2042	
70.—Sugar (Nipah) :—		
1st Prize, Hadji Ibrahim Selangor	2084	5
2nd ,, Koh Boon Cheh Perak	1837	3
71.—Sugar (Kabong) :—		
1st Prize, Hadji Mohamud Yasin, Perak	1794	5
2nd ,, Syed Ahmed, Selangor	2042	3
3rd ,, Udah Mat Isah, Perak	1574	1
72.—Sugar (cane) brown :—		
Penang Sugar Estate	568	5
73.—Sugar (cane) refined :—		
Penang Sugar Estate	568	5
74.—Honey in the Comb :—		
1st Prize, Rev Father Gex, Singapore	44	5
75.—Tapioca Roots :—		
1st Prize, Kee Teck Wee, Penang	569	5
2nd ,, Ong Kim Wee, Perak	2602	2
3rd ,, Raja Said, Klang	1524	1
H. C., Asst. Penghulu Abdul Wahab, Perak	1524	
76.—Tapioca varieties :—		
1st Prize, Lee Ah Pow, Perak	1858	10
2nd ,, J. Slothard, Penang	599	5
77.—Tapioca pearl :—		
1st Prize, Messrs. J. Brinkmann & Co., Singapore	73	5
2nd ,, Ong Kim Wee, Malacca	1032	3
3rd ,, Asiatic Produce & Rubber Coy., Malacca	1089	1
78.—Tapioca flake :—		
1st Prize, J. Slothard, Penang	599	5
2nd ,, Malacca Rubber Plantation Ltd., Malacca	1138	3
3rd ,, Messrs. S. Brinkmann & Co., Singapore	73	1
79.—Tapioca flour :—		
1st Prize, Lee Keng Hee, Malacca	1122	5
2nd ,, Leng Cheak & Co., Penang	509	3
3rd ,, J. Slothard, Penang	599	1
H. C., Penang Sugar Estate, Penang	568	
80.—Tapioca preparation :—		
1st Prize, Asiatic Rubber Plantation Ltd., Malacca	1089	5
2nd ,, J. Slothard, Penang	599	3

Class No.	Exhibit No.	Amount $
81.—Tea:—		
1st Prize, Durian Tonggol Estate, Malacca	162	Medal
2nd ,, The Sione Rubber Estate, Selangor	2057	5
3rd ,, Mohamud Arsat, Penang	513	2
82.—Toddy:—		
1st Prize, Sulong Bin Aris, Malacca	1034	3
2nd ,, Hussain Bin Abu, Klang	2066	2
83.—Tuba:—		
1st Prize, Mohamud Kassim, Land Office, Penang	505	3
2nd ,, C. Gwah Chu, Bukit Mertajam, Penang	593	2
84.—Turmeric:—		
1st Prize, Kong Then Seng, Survey Office, Penang	511	5
2nd ,, Dain, Kelawai, Penang	559	3
3rd ,, A. D. Machado, Kamuning, Perak	1500	1
85.—Walking Sticks:—		
1st Prize, Omar Bin Mohamud Yousop, Singapore	19	Medal
2nd ,, Mohamud Abas, Perak	1856	5
3rd ,, Jaffar Tod Kaya, Penang	544	2

Division B.

FLOWERS, FRUITS AND VEGETABLES.

86.—Aroids:—		
H. M., Mrs. R. A. J. Bidwill, Dalvey Road, Singapore	70	
H. C., O. Muhlenbein, Nassim Road, Singapore	30	
87.—Aroids, best specimen:—		
1st Prize, Mrs. R. A. J. Bidwill, Singapore	70	4
2nd ,, Mrs. St. V. B. Down, Anderson Road, Singapore	75	2
88.—Caladiums (6):—		
1st Prize, Choa Kim Keat, c/o Straits Trading Coy., Singapore	10	5
2nd ,, Mrs. R. A. J. Bidwill, Singapore	70	3
89.—Caladium (I):—		
1st Prize, Mr. Alex. Gentle's Gardener, Nassim Road	57	4
90-92.—No award.		
93.—Crotons, best specimen:—		
1st Prize, Mrs. L. P. van Cuylenburg, Paterson Road, Singapore	48	5
94.—Dracaenas:—		
1st Prize, Choa Kim Keat, Singapore	10	5
95.—Dracaenas, best specimen:—		
1st Prize, Choa Kim Keat, Singapore	10	3
96.—Ferns, any variety:—		
1st Prize, Mrs. St. V. B. Down, Singapore	75	10
97.—Ferns (Adiantums):—		
1st Prize, Mrs. van Cuylenburg, Singapore	48	8
2nd ,, Mrs. St. V. B Down, Singapore	75	4

Class No.		Exhibit No.	Account. $
98.—Ferns (Adiantums), distinct :—			
	1st Prize, Mrs. R. A. J. Bidwill	70	5
99.—Ferns, any variety :—			
	1st Prize, Mrs. St. V. B. Down, Singapore	75	4
100.—Marantas :—			
	1st Prize, O. Muhlenbein, Singapore	30	8
101.—Marantas, best :—			
	1st Prize, Mrs. St. V. B. Down, Singapore	75	4
102.—Palms, distinct :—			
	1st Prize, Choa Kim Keat, Singapore	10	Medal
	2nd ,, Joe Constantine, Raffles Hotel, Singapore	183	5
103.—Palms, best :—			
	1st Prize, Chesney Duncan, Penang	580	5
	2nd ,, Mrs. St. V. B. Down, Singapore	75	3
	Special Prize, Choa Kim Keat, Singapore	10	3
104–106.—No award.			
107.—Foliage plant :—			
	1st Prize, Choa Kim Keat, Singapore	10	5
108.—No award.			
109.—Foliage plant, best :—			
	1st Prize, Choa Kim Keat, Singapore	10	5
109 (*a*).—Foliage plant collection :—			
	1st Prize. A Cup presented by Hon. Tan Jiak Kim, Choa Kim Keat, Singapore	10	
110-113.—No award.			
114.—Cannas :—			
	1st Prize, Rev. Father Gex, Singapore	44	3
115.—No award.			
116.—Cannas, best :—			
	1st Prize, Rev. Father Gex, Singapore	44	2
117.—Cockscombs :—			
	1st Prize, Singapore	10,000	2
118.—Chrysanthemums :—			
	1st Prize, Mrs. D. W. Lovell, Cluny Road, Singapore	56	3
119.—Dahlias :—			
	1st Prize, Choa Kim Keat, Singapore	10	3
120-122.—No award.			
123.—Orchids, :—			
	1st Prize, Choa Kim Keat, Singapore	10	12
123 (*a*).—Orchids, best :—			
	1st Prize, Mrs. St. V. B. Down, Singapore	75	10
124.—Orchids, specimen :—			
	1st Prize, Choa Kim Keat, Singapore	10	5
125.—Phlox :—			
	1s Prize, Mrs. Pennefather, Scott Rd., Singapore	116	3

Class No.	Exhibit No.	Account. $
126.—Petunias:—		
1st Prize, P. S. Falshaw, Singapore	160	3
127.—None shown.		
128.—Roses, best:—		
1st Prize, Mrs. Pennefather, Singapore	116	3
129-130.—None shown.		
131.—Plant in Flower:—		
1st Prize, Mrs. Sugden, Tanglin, Singapore	195	5
132.—Begonias:—		
1st Prize, P. S. Falshaw, Singapore	160	5
2nd ,, Choa Kim Keat, Singapore	10	3
133.—Begonias, best:—		
1st Prize, Choa Kim Keat, Singapore	10	3
134.—Group of plants:—		
1st Prize, Mrs. R. A. J. Bidwill, Singapore	70	8
135.—Group of Chinese plants:—		
1st Prize, Seah Liang Seah, Singapore	65	5
136-139.—None shown.		
140.—Cannas:—		
1st Prize, Father Gex, Singapore	44	3
2nd ,, Mrs. St. V. B. Down, Singapore	75	2
141.—Orchids:—		
1st Prize, Mrs. St. V. B. Down, Singapore	75	3
142.—Bridal Bouquet:—		
1st Prize, Miss. J. Gray, Singapore	110	5
143.—None shown.		
144.—Cut flowers, arranged:—		
1st Prize, Miss Moss, Singapore	12	3
145.—Cut flowers, collection:—		
1st Prize, Choa Kim Keat, Singapore	10	5
146.—Table Decoration:—		
1st Prize, Mrs. St. V. B. Down. A Cup presented by Choa Kim Keat Esq.		
2nd Prize, Mlle. de Gaspery, Singapore	229	10
147.—None shown.		
148.—Button-holes:—		
1st Prize, Miss Schomburgk, Singapore	171	3

SECTION 2.—FRUITS.

Class No.	Exhibit No.	Account. $
149.—Bananas:—		
1st Prize, Mohamud Yunos To Kaya, Kelawi, Penang	604	10
2nd ,, Syed Ahmat, Land Office, Penang	512	5
150.—Bananas, best:—		
1st Prize, Penghulu Kakit Goyang, S'Tapa, Kuala Lumpur	2040	3
2nd Prize, Yacob, Labu Ulu, Selangor	2553	2

Class No.		Exhibit No.	Amount $
151.—Champadak:—			
	1st Prize, Penghulu Ahmat Bin Surin, Krubong, Malacca	1000	2
152.—Chiku:—			
	1st Prize, Rev. Father Gex, Singapore	44	3
	2nd ,, Jaludin, Pengkalan Ramah, Malacca	187	2
153.—Custard Apple:—			
	1st Prize, Miss. E. E. Brown, River Valley Rd., Singapore	16	2
	2nd Prize, H. H. Norris, Singapore	1	1
154.—Cultivated Fruits (Collection):—			
	1st Prize, D. Logan c/o Farrer Baynes, Singapore. A Cup presented by Mr. H. Marriot	241	
	2nd ,, H. H. Norris, Singapore	1	5
155.—Durians:—			
	1st Prize, Hadji Mat Saman, Batu Kurau, Perak	1801	5
	2nd ,, Litah Bin Go Mankok, Ulu Langkat, Selangor	2053	2
156.—Durian Blanda:—			
	1st Prize, Sedang Rahim, Pegoh, Malacca	1061	2
157.—Duku:—			
	1st Prize, Penghulu Yusuf Bin Buang, Chobong, Malacca	1132	3
	2nd Prize, Penghulu Sulong Bin Hussin, Chinchin, Malacca	1131	2
158.—None shown.			
159.—Jack Fruit:—			
	San Bin Hadji Ismail, 40 Pahang St., Singapore	215	2
160.—Jambu:—			
	1st Prize, Mohamud Arsat, Caunter Hall, Penang	513	2
161.—None shown.			
162.—Limes.			
	1st Prize, Penghulu Anjang Abdullah, Kampong Gajah, Perak	1780	5
	2nd Prize, A. D. Machado, Perak	1500	3
163.—None shown.			
164.—Machang:—			
	1st Prize, Chee, Ayer Hitam, Penang	514	2
165.—Mangosteen:—			
	1st Prize, Hadji Munahon, Rope Walk, Penang	547	5
	2nd ,, Hadji Mat Yarsin, Setul, Malacca	2529	3
166.—Mata Kuching:—			
	1st Prize, Hadji Alam Bin Pongut, Nyalas, Malacca	1107	2
167.—Melon:—			
	1st Prize, Rajah Hitam Nongchi, Johore	125	3
168.—Papaya:—			
	1st Prize, Rajah Hitam Nongchi, Johore	125	3

Class No.	Exhibit No.	Amount. $
169.—Oranges:—		
1st Prize, G. F. Bird, Kuala Kangsar, Perak	1521	3
2nd ,, Along Mohamud Talip, Passir Salak, Perak	1778	2
170.—Pine apples (Mauritius):—		
1st Prize, W. Dunman, Singapore	124	3
2nd ,, Kauteem Seng, Survey Office, Penang	511	2
171.—Pine apples (any other):—		
1st Prize, Sri' Ressam, Johore	155	3
2nd ,, Hukum, Tanjong Malim, Perak	1855	2
172.—Pomeloes:—		
1st Prize, G. F. Bird, Kuala Kangsar, Perak	1521	2
2nd ,, R. W. Munro, Kuala Langat, Selangor	219	1
173.—Pulasan:—		
1st Prize, Rajah Hitam Nongchi, Johore	125	2
174.—Rambai:—		
1st Prize, Sidang Baba Bin Arshad, Duyong, Malacca	1133	2
2nd Prize, Penghulu Ahmat Bin Surin, Krubong, Malacca	1000	1
175.—Rambutan:—		
1st Prize, Sahut, Bantai, Kuala Lumpur	2540	2
2nd ,, Mohamud Hassim, Kampong Bahru, Penang	523	1
176.—Wild Edible Fruits:—		
1st Prize, Penghulu Rahmat, Batu Pahat	132	5
2nd ,, Said Ahmat, Penang	512	3
177.—Any kind of fruits:—		
1st Prize, Sri' Ressam, Johore	155	3
2nd ,, R. W. Munro, Selangor	219	2
Special Prize, F. G. Desker, Singapore	72	2
178.—Preserved Fruits:—		
1st Prize, Rajah Hitam Nongchi, Johore	125	10
2nd ,, Penghulu Ahmat Bin Surin, Krubong, Malacca	1000	5
3rd Prize, Mohamud Kassim, Land Office, Penang	505	3
179.—Chutney:—		
1st Prize, Francis Alexander, Kuala Lumpur	2041	5
(Special Prize) Mr. Lesslar, Taiping, Perak	1777	3
180.—Pickles:—		
1st Prize, Mrs. A. C. Moses, Singapore	42	5
Special Prize, Mr. Lesslar, Perak	1777	3
181.—Jellies:—		
1st Prize, Francis Alexander, Kuala Lumpur	2041	5
182-184.—None shown.		
185.—Brinjals:—		
1st Prize, Daud Bin Burok, Nyalas, Malacca	1108	2

Class No.		Exhibit No.	Amount $
186.—Beans :—			
	1st Prize, Chee, Ayer Hitam Penang	514	3
187.—None shown.			
188.—Chilis :—			
	1st Prize, Kendat Bin Hitam, Nyalas Malacca	1110	3
	2nd ,, Francis Alexander, Kuala Lumpur	2041	2
189.—Cucumber :—			
	1st Prize, Mohamud Kassim, Land Office, Penang	505	2
190.—None shown.			
191.—Ladies Fingers :—			
	1st Prize, Ali Bin Wahid, Penang	515	2
192.—Lettuces :—			
	1st Prize, Ali Bin Wahid, Penang	515	2
193.—None shown.			
194.—Pumpkins :—			
	1st Prize, Penghulu Abdul Wahab, Temerloh Perak	1524	2
195.—Radish :—			
	Mohamud Kassim, Penang	505	5
196.—None shown.			
197-198.—None shown.			
199.—Watermelons, etc. :—			
	1st Prize, Ali Bin Wahid, Penang	515	5
200.—Yams :—			
	1st Prize, Penghulu Matsaid Bin Ma'Ali, Tanjong Minyak, Malacca	1010	5
	2nd Prize, Rajah Hitam Nongchi, Johore	125	3
201.—Any other Vegetables :—			
	1st Prize, Alang, Kuala Kangsar, Perak	1604	3
	2nd ,, Mrs. F. J. Benjafield, Singapore	54	2

Division C.

Stock and Dairy Produce.

202.—Bull Locally Bred :—			
	1st Prize, Mungol Singh, Serangoon Road, Singapore	82	20
	2nd ,, Es. Galopsah, 17 Burmah Road, Singapore	120	10
203.—Cow, Locally Bred :—			
	1st Prize, Es. Galopsah, Singapore	120	20
204.—Bull or Bullock, Indian :—			
	None shown.		
205.—Cow and Calf, Imported Indian :—			
	1st Prize, Abdul Wahid, Rochore Road, Singapore	86	20
206.—Cow and Calf, Locally Bred :—			
	1st Prize, Es. Galopsah, Singapore	120	20

Class No.		Exhibit No.	Amount. $
207.	—Best Milk Cow of any kind :—		
	1st Prize, Abdul Wahid, Singapore. A Cup presented by Hon. A. T. Bryant	86	
208.	—Pair of Draught Oxen, Siamese :—		
	None shown.		
209.	—Pair of Draught Oxen, Indian :—		
	1st Prize, Mariappen, Singapore (Silver Medal)	90	
	2nd ,, Kader Ali, Marikar, Mohamud, Sultan Road	88	5
210.	—Best Pair of Draught Buffalos :—		
	None shown.		
211.	—Buffalo Bull, Indian :—		
	1st Prize, Abdul Majid, Macpherson Road, Singapore	97	15
212.	—Buffalo Cow, Indian :—		
	1st Prize, Siva Sunga, Serangoon Road, Singapore	102	15
	2nd ,, Sedang, Serangoon Road, Singapore	96	8
213-214.	—None shown.		
215.	—Champion Animal :—		
	1st Prize, Mungal, Sing, Singapore	82	20
216.	—Boar :—		
	1st Prize, Dr. Lim Boon Keng, Singapore	39	10
217.	—None shown.		
218-219.	—None shown.		
220-222.	—None shown.		
223.	—Goat Ewe with Kids :—		
	1st Prize, Sheik Mohamud, 40 Buffalo Road, Singapore	179	10
224.	—None shown.		
225.	—Sheep Ram :—		
	1st Prize, Abdul Wahid, Singapore	86	10
226.	—Sheep Ewe :—		
	1st Prize, Abdul Wahid, Singapore	86	10
227.	—Sheep Best Pen of six Indian Breed :—		
	1st Prize, Abdul Wahid, Singapore	86	10
228.	—Sheep Best Pen of six Javanese Breed :—		
	1st Prize, Ali Bin Ahmat, 91 Beach Road, Singapore	62	10
229.	—Bantam Cock and Hen :—		
	1st Prize, Mrs. Hawtrey, Singapore	105	5
	2nd ,, Lim Ben Cheng, Singapore	196	3
230.	—Malay Cock and Hen :—		
	1st Prize, Yu Mat Ali, Kampong Boua, K. Kangsar, Perak	1606	5
	2nd Prize, Hadji Ibrahim, Upper Perak	1507	3
231.	—Malay Game Cock and Hen :—		
	1st Prize, Mrs. Hawtrey, Singapore	105	5
232.	—Collection of Malay Fowls :—		
	2nd Prize, Hadji Mohamud Yasin, S'Tiwan, Perak	1794	5

Class No.		Exhibit No.	Amount. $
233.	—None shown.		
234.	—Collection of Fowls any Breed :—		
	1st Prize, Mrs. Hawtrey, Singapore	105	10
	2nd ,, Mrs. R. A. J. Bidwell, Singapore	70	5
235.	—Best Cock and Hen any Breed :—		
	1st Prize, H. G. Wightwick, 51 Devonshire Road, Singapore	80	5
	2nd Prize, Mrs. Hawtrey, Singapore	105	3
236.	—Muscovy Duck and Drake :—		
	1st Prize, K. A. Stevens, Singapore	194	10
237.	—Manila Duck and Drake :—		
	1st Prize, Rahlm Bin Hassin, Tabo Naning Malacca	1077	5
238.	—Pair of Duck and Drake any Breed :—		
	Che Mat Krani, Sungei Ara, Penang	588	5
239.	—Duck and Drake Hybrid :—		
	1st Prize, Hadji Othman, Butterworth, Penang	536	5
240.	—Gander and Goose :—		
	1st Prize, Chuan Keng Peng, 30 South Bridge Road, Singapore	175	5
	2nd Prize, K. A. Stevens, Singapore	194	3
241.	—Pair of Turkey, Cock and Hen :—		
	1st Prize, Mrs. Hawtrey, Singapore	105	5
242.	—Pair of Guinea Fowl :—		
	1st Prize, Mrs. Hawtrey, Singapore	105	5
243.	—Pair of Pigeons :—		
	1st Prize, Miss. E. Schomburgk, Singapore	171	5
	2nd ,, H. G. James, 28 Syed Ali Road, Singapore	79	3
244.	—None shown.		
245.	—Best Cage Bird :—		
	1st Prize, Chea Eng Heng, 6 North Boat Quay, Singapore	15	5
	2nd Prize, Inche Dallah, 75 Anson Road, Singapore	78	3
246.	—None shown.		
247.	—Pair of Rabbits :—		
	1st Prize, Miss. E. E. Brown, Singapore	16	5
	2nd ,, F. Hilton, Singapore	189	3
248.	—None shown.		
248(*a*).	—Champion Cat in the Show :—		
	1st Prize, Miss Edith Daly. A cup presented by Hon. A. T. Bryant	5	
	2nd Prize, O. Muhlenbein, Singapore	190	10
249.	—None shown.		
250.	—Collection of Eggs :—		
	1st Prize, Mrs. Abrams, Singapore	106	5
	2nd ,, ,, M. Stuart, Singapore	26	3

Class No.

250(*a*).—Best Locally made Soap:—
1st Prize, C. Hock Leong & Co., 23 Park Road, Singapore (Silver Medal)

251.—Best Turnout Bullock cart:—
None shown.

Division D.

(HORSES AND DOGS.)

Horses.

252.—Polo Pony:—
1st Prize, J. B. Young. A cup presented by H. Payne-Galwey, Esq.
2nd Prize, Mr. Spooner. A cup presented by the Committee.

253.—Gentleman's Hack (14.2 and under):—
1st Prize, Mr. J. B. Young. A cup presented by C. Sugden, Esq.
2nd Prize, Mr. J. B. Young. A cup presented by the Committee.

254.—Gentleman's Hack (14.2 and over):—
1st Prize, Mr. C. Sugden. A cup presented by E. F. H. Edlin, Esq.
2nd Prize, Capt. Mackintyre. A cup presented by the Committee.

255.—Single Harness Pony (14.2 and under):—
1st Prize, Mrs. Diepenheim. A cup presented by Dr. Galloway.
2nd Prize, Miss E. Abrams. A cup presented by the Committee.

256.—Single Harness Horse (14.2 and over):—
1st Prize, H. Abrams. A cup presented by the Bankers.
2nd ,, Mr. Geo. Greaves. A cup presented by the Bankers.

257.—Lady's Hack:—
1st Prize, Mrs. Stitt. A Silver Bowl presented by J. B. Young.
2nd Prize, Miss Abrams. A cup presented by the Committee.

258.—Jumping Pony (14.2 and under):—
1st Prize, Capt. Macintyre. A cup presented by W. D. Barnes, Esq.
2nd Prize, Mr. Pickering. A cup presented by the Committee.

259.—Jumping Horse (14.2 and over):—
1st Prize, Mr. H. Abrams. A cup presented by the Brokers.
2nd ,, Mrs. Stitt. A cup presented by the Committee.

260.—Double Turnout:—
1st Prize, Messrs. Schmidtmann & Tan Liang Kee. A cup presented by Noel Trotter, Esq.
2nd Prize, Mrs. Diepenheim. A cup presented by the Committee.

Class No.

261.—Gharry Turnout:—

1st Prize,	Medde Bin Hadji Hasan	$20
2nd ,,	Barsey	10
3rd ,,	Seman	5

262.—Best Horse or Pony:—
C. Sugden, Esq. A cup presented by D. K. and J. Sommerville, Esq.

Dogs.

263.—Smooth-Haired Fox Terrier Dog.
1st Prize, H. Kirwan, Esq. A cup presented by L. S. Lewis, Esq.
2nd Prize, Miss Littlefair. A cup presented by the Committee.

264.—Smooth-Haired Fox Terrier Bitch.
1st Prize, H. C. Sechehay. A cup presented by R. Ker, Esq.
2nd ,, G. E. Mosley. A cup presented by the Committee.

265.—Rough-Haired Fox Terrier Dog.
1st Prize, J. B. Young, Esq. A cup presented by A. R. Linton, Esq.
2nd Prize, T. C. B. Miller. A cup presented by the Committee.

266.—Rough-Haired Fox Terrier Bitch.
1st Prize, Mrs. Fittock. A cup presented by the Committee.

267.—Chow Dog or Bitch.
1st Prize, H. P. Kinghorn, Esq. A cup presented by J. Graham, Esq.

268.—Spaniel Dog or Bitch.
1st Prize, E. M. Janion, Esq. A cup presented by Geo P. Owen, Esq.
2nd Prize, D. Robertson, Esq. A cup presented by the Committee.

269.—Irish Terrier Dog.
1st Prize, Mrs. Diepenheim. A cup presented by F. Hilton.
2nd ,, Major Ritchie. A cup presented by the Committee.

270.—Irish Terrier Bitch.
1st Prize, F. Hilton. A cup presented by A. D. Allan, Esq.

271-272.—Kangaroo House Dog or Bitch.
1st Prize, K. A. Stevens, Esq. A cup presented by Mr. H.C. Ehrseefells.

273.—Dog or Bitch any Breed.
1st Prize, Tan Peck Wan. A cup presented by E. M. Janion, Esq.
2nd Prize, Teo Cheng Hee. A cup presented by the Committee.
3rd ,, Mrs. St. V. B. Down. A cup presented by the Committee.

Class No.

274.—Champion Dog or Bitch.
1st Prize, Tan Peck Wan. A cup presented by the Borneo Coy.
2nd Prize, E. M. Janion, Esq. A cup presented by the Committee.
3rd Prize, Mrs. St. V. B. Down. A cup presented by the Committee.

NATIVE INDUSTRIES.

	$
275.—Ornamental Baskets :—	
5 prizes of $5 each were allowed.	
No. 1025 Haji Ma' Ali, 'Tanjong Kling Malacca	5
,, 1123 Mahani binte Mamat, Tanjong Kling, Malacca	5
,, 1124 Nilan binte Lateh, Tanjong Kling, Malacca	5
,, 1125 Jijah binte Jahudin, Tanjong Kling, Malacca	5
,, 1126 Saliah binte Ladi, Tanjong Kling, Malacca	5
276.—Lace work :—	
1st Prize, 1012 Penghulu Baba, Pringgit, Malacca	10
2nd ,, Senah Binte Salleh, Malacca, Lace work	5
277.—Leather work no prize :—	
278.—Rope and twine —	
1st prize, No. 600 Shuth Hussin, Golf Club, Penang	10
2nd ,, No. 1804 Wan Mohamed Nasie, Bukit Gantang, Perak	5
279.—Tali Ijok :—	
1st Prize, No. 1048 Nudin bin Kali, Gadok, Malacca	10
2nd ,, ,, 1051 Penghulu H. Saleh, Malaha Pindah	5
280.—Attaps :—	
1st Prize, No. 1786 H. Mohamed Tahir, Sungei Durian, Perak	10
2nd ,, ,, 1785 Mohamed Nurdin, Kota Stia, Perak	5
281.—Kajangs :—	
1st Prize, No. 150 Inche Omar, Kota Tinggi, Johore Medal	
2nd ,, ,, 1790 H. Mohamed Ali, Peduka Rajah, Pulau Tiga, Perak	5
282.—Chicks :—	
1st Prize, No. 600 Sheikh Hussin, Golf Club, Penang	10
2nd Prize, No. 560 Nyak Ah Yum, Klawei, Penang	5
283.—Mats. None shown.	
284.—Rattan Mats :—	
1st prize, No. 1840 Pandak Abdullah, Bagan Serai, Perak	10
2nd Prize, No 1779 Mohamed Noh, Bagan Datch, Perak	5
285.—Malay Mats :—	
1st Prize, No. 1844 Penghulu, Ulu, Selama, Perak	10
2nd ,, ,, 575 Mat Bin Mohamed Dain, Rope Walk, Penang	5

Class No.	$
286.—Hats:—	
1st Prize, No. 2620 Senin binte Chee, Port Dickson, N. Sembilan	10
2nd Prize, No. 2625 Tiah binte Ma' Arip Sungei Rusa, N. Sembilan	5
287.—Brushes and Brooms:—	
1st Prize, Nil	
2nd ,, No. 600 Sheikh Hussin, Gulf Club, Penang	5
288.—Collection of articles made from Coconut palms:—	
1st Prize, No. 1781 Mohamed Arshad, Clerk, Lower Perak	10
2nd Prize, No. 1790 H. Mohamed Ali, Peduka Rajah, Perak	5
289.—Articles made from Kabong:—	
1st Prize, Nil	
2nd ,, No. 1567 Megat Abdul Magid, Senggang, K.K.	5
290.—Articles made from Nibong:—	
1st Prize } Nil 2nd ,, }	
291.—Set of Sireh apparatus:—	
1st Prize, No. 2670 To Mentri Perkasa Sahia, Rambu N. Sembilan	10
2nd Prize, No. 1552 Mahubuh, Kota, Lama Kiri, Kuala Kangsa	5
292.—Model Malay houses:—	
1st Prize, 1804 Wan Mohamed Nasie, Bukit Gantang, Perak	10
2nd Prize, No. 1538 Pandah Mohamed Asik, Kota Lama, Perak	5
Special prize $5 No. 1787 Haji Mohamed Nasie, Utan Melintang, Perak	5
293.—Model Fishing Stakes:—	
1st Prize, No. 1794 H. Mohamed Yasin, Steawan, Perak	10
2nd Prize, No. 1018 Penghulu Usop, Klebang Besar, Malacca	5
294.—Snares and Traps:—	
1st Prize, No. 1794 H. Mohamed Yasin, Stewan, Perak	10
2nd Prize, No. 1787 H. Mohamed Nasie, Utan Melintang, Perak	5
295.—Wood Carving:—	
1st Prize. Nil.	
2nd ,, No. 529 Yib, Butterworth, Province Wellesley	5
296.—Embroidery:—	
1st Prize, No. 1577 Datoh Stea, Saing, Kulua Kangsa	10
and No. 1769 Rajah Bila, Papan, Perak	10
2nd Prize, No. 1116 Abu bin Dor, Pengkalan Bama, Malacca	5
and No. 1016 Haji, Sahid, Alei, Malacca	5

Class No.	$
297.—Silk Sarong :—	
1st Prize, No. 1782 Raja Abdul Malik, Teluk Anson, Perak	10
2nd Prize, No. 168 Salleh, 7 Java Road, Singapore	5
298.—Cotton Sarong :—	
1st Prize, No. 541 Sheikh Yusuf, Butterworth, Province Wellesley	10
2nd Prize, No. 1502 H. Berheby, Upper Perak	5
299.—Brass Ware :—	
1st Prize, No. 549 Haji Mohamed Syed, Acheen Street, Penang	10
2nd Prize. Nil.	
300.—Silver Ware :—	
1st Prize, No. 165 Lagid, 135 Arab Street, Singapore	10
2nd ,, Nil.	
301.—Tin Ware :—	
1st Prize, No. 2517 Kwan Lum, Seremban	10
2nd ,, ,, 2520 Siow Chin, Seremban	5
302.—Kriss-sheaths and knife handles :—	
1st Prize, No. 536 Haji Othman, Butterworth, P. W.	10
2nd ,, ,, 1552 Mehabuh, Kota Lama Kiri, Perak	5
303.—Fishing Nets :—	
1st Prize, No. 218 Haji Mohamed Ali, Perak	10
2nd ,, ,, 1788 Abdullah Ali, Teluk Bahru, Perak	5
304.—Sakei Articles :—	
1st Prize, No. 1851 Penghulu, Tapah, Perak	10
2nd ,, ,, 1034 Sulong bin Aris, Bringin, Malacca	5
305.—Collection of Photographs :—	
Commended No. 1500 A. D. Machado, Kamuning, Perak.	
306.—Miscellaneous :—	
1st Prize,	
2nd ,, 226 Sit Yow Kun, 27 Duxton Hill, Singapore	10
and 20 F. A. Langley, Guthrie and Co., Singapore	5
307.—Building Bricks :—	
1st Prize, No. 1856, Mohamed Abas, Tanjong Malim, Perak	10
2nd Prize, No. 45, Alexandra Brick Works, Singapore	
124 Highly Commended W. Dunman, Singapore	
1541 Honourable mention, Penghulu Indub, Perak	
308.—Roofing tiles :—	
1st Prize, No. 1541, Penghulu Indut, Kota Lama Kanan, Perak	10
2nd Prize, No. 1002, Penghulu Masap, Bachang, Mallacca	5
309.—Flooring tiles :—	
1st Prize, No. 22, Alfred Lea, Hill Street, Singapore	10
2nd ,, ,, 1541, Penghulu Indut, Kota Lama Kanan, Perak	5

Class No.		$
310.—Bird Cages :—		
	1st Prize, No. 536, Haji Othman, Butterworth, P. W.	10
	2nd Prize, No. 535, Penghulu Taha Permatang Bertam, P. W.	5
311.—Plough :—		
	1st Prize No. 1018 Penghulu Usop, Klebang Besar Malacca	10
	2nd Prize. Nil.	
312.—Bertam Work :—		
	1st Prize. Nil.	
	2nd „ No. 512, Syed Ahmat, Land Office, Penang	5
313.—Flower pots and fancy pots :—		
	1st Prize, No. 2094, Li Kong Lam, Selangor	10
	2nd „ „ 530, Murugapa, Butterworth, P. W.	5
314.—Chatties (earthenware) :—		
	1st Prize, No. 1790, H. Mohamed Ali, Peduka Raja, Pulau Tiga, Perak	10
	2nd Prize, No. 1792, Mohamed Mansur, Durian Sebatang, Perak	5
314A.—		
	Special Prize, $10 for drawn-thread work No. 17, Kwong Seng, Singapore.	
	Special Prize, $5 for set of carved coconut shells No. 248.	
	Special Prize, $5 for table and chair, Katingga wood No. 1503, Ismail, Upper Perak.	

Class No.	*Competitors from Schools.*	Exhibit No.	Amount. $
315.—Malay Hand-made Pottery :—			
	1st Prize, Kampong Kedah Boys, Perak	1686	10
316.—Malay Hand-made Fancy Pottery :—			
	1st Prize, Pulau Tiga, Malay School, L. Perak	1671	10
317.—Ornamental Baskets :—			
	1st Prize, Bagan Serai Girls, Malay School, Krian, Perak	1696	10
	2nd Prize, Gunong Senanggol, Malay School, Taiping, Perak	1638	5
	H. C. Mohamed Bin Mohd. Noor, Kwala Lumpur School	2026	
	H. M. do do		
318.—Malay Mats (Pandanus) :—			
	1st Prize, Lambor Kanan, Malay School, K. Kangsar, Perak	1756	10
	2nd Prize, Bagan Serai Girls, Malay School, Krian, Perak	1696	5
	Special Prize, Batu Gajah Girls, Malay School, Kinta, Perak	1728	3
	H. C. Bagan Serai Girls, Perak	1696	
	H. C. Lombor Kanan, Perak	1756	

Class No.	Exhibit No.	Amount. $
319.—Sireh Apparatus, set :—		
1st Prize, Lakan Binte Bachee, Kwala Lumpur, School	2023	10
2nd Prize, Teluk Bahru, Malay School, L. Perak	1668	5
320.—Model Malay House :—		
1st Prize, Tanjong Piandang, Malay School, Krian, Perak	1689	10
2nd Prize, Teluk Pial, Malay School, Krian, Perak	1694	5
H. C. Bulat Teacher, Bernang School, Selangor	2010	
321.—Model Fishing Stakes :—		
1st Prize, Slim, Malay School, Batang, Padang, Perak	1724	10
2nd Prize, Temerlok's Boys Malay School, Matang, Perak	1652	5
322.—Wood Carving :—		
1st Prize, Bulat Teacher, Bernang School, Selangor	2010	10
2nd ,, Sudin Teacher, Bernang School, Selangor	2007	5
323.—Embroidery :—		
1st Prize, Bandar Girls, Malay School, L. Perak	1682	10
2nd ,, Teluk Anson Girls, Malay School, L. Perak	1681	5
Special Prize, Minah Binte Bakar, Girls School, Kwala Lumpur	2015	5
Extra Prize, Teluk Anson Girls, Perak	1681	3
H. C. do do		
H. C. Bandar Girls		
324.—Sarong (Silk) :—		
1st Prize, Kota, Lama Kiri Girls, Malay School, K. Kangsar, Perak	1753	10
2nd Prize, Kota, Lama Kiri Girls, Malay School, K. Kangsar, Perak	1753	5
Special Prize, Taiping Girls, Perak	1644	3
H. C. Girls, Schools, Malay Settlement, Kwala Lumpur	2022	
325.—Sarong (Cotton) :—		
1st Prize, Matang Girls, Matang, Perak	1659	10
2nd ,, Lenggong Girls, Upper Perak	1765	5
326.—Snares etc., collection :—		
1st Prize, Sungei Saikap, Malay School, Krian, Perak	1690	10
2nd Prize, Temoh Malay School, Batang Padang, Perak	1721	5
327.—Fishing Nets :—		
1st Prize, Jeram School Boys, Kwala Lumpur	2000	10
2nd ,, do do	2000	5
H. C. do do		
328.—Miscellaneous :—		
1st Prize, Teluk Anson Boys, L. Perak	1662	10
2nd ,, Sungei Rusa, Boys, L. Perak	1678	5
Special Prize, Tanjong Piandang, Krian, Perak	1689	3

The following table shews the Number of Exhibitors in each Division, places from which they came, and the prizes gained.

	Agricultural Produce.	Flowers, Fruits and Vegetables.	Stock and Dairy Produce.	Horses and Dogs.	Native Industries.	Agricultural Implements.	Prizes.	Certificate.	Medals.
	A	B	C	D	E	F	$		
Singapore	78	173	136	250	55	13	720	43	11
Penang..	282	118	20	..	122	9	303	3	4
Malacca	352	102	14	..	123	8	217	..	1
Perak	793	102	60	..	699	30	837	2	4
Selangor	144	44	11	..	145	3	173	2	4
Negri Sembilan	131	31	15	..	123	4	56	..	..
Pahang..	30	..	..	..	..	..	7	..	..
Johore	12	37	4	..	89	..	49	2	1
	2,122	607	260	250	1,356	69	2,362	52	25

NOTES ON MANAGEMENT OF EXHIBITIONS BY

G. A. HALL.

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a. As to organisation preceding the opening, it would be an improvement to make a register for each section, as the entries are notified, with a page devoted to each class, so that all the entries for a class, with the exhibitors' names and addresses, would be shown together. The secretary could then accompany the judges with this register, and note down the prizes in it, and the preparation of the prize-list would then be a mere matter of copying. Such an arrangement would save much time and trouble, and would further enable the Secretary to allot his space beforehand, by showing the items under which the largest quantity of exhibits was to be expected. It would also form a record of the show for further reference.

b. The prize-list should not be copied from any former prize-list without careful examination. It should not be adopted by a large and hurried public meeting, but gone through section by section by a few persons who have had actual experience in former shows. Take for instance Division " E. " There were complaints that people could not find things because they were not arranged in the order given in the prize-list, but with a prize-list like this it is not possible to keep to the order. First we have ornamental baskets, next lace-work, then leather work, rope, attaps, kajangs, mats, hats, brooms and other collections of articles made from coconut-palms. It is obviously impossible to arrange attaps, kajangs and similar exhibits on shelves alongside lace-work, and curios made of coconut shells. Further down we came to sireh apparatus then models and then wood-carving and embroidery, fishing nets between krisses and sakei articles and bird-cages between flooring tiles and ploughs. The best way would be to arrange all delicate and valuable articles together so that they could be displayed in the order given in the prize-list. For instance lace, silks, embroidery, silver ware, sireh apparatus, krisses, curios made of coconut shells, brass-ware, and wood-carving might easily be classified in the order in which they could be displayed as could also cumbrous things like attaps, kajangs, chicks, mats, brooms batam-work, and earthenware. Models should have a shed to themselves. They take an immense amount of room and require special accommodation. Perhaps a shed to contain all models, attaps, kajangs, brooms, brushes, fishing-nets, ploughs and agricultural implements generally, would be the best solution of the difficulty. The result of crowding models into the native industries section is that space is filled by them which is badly wanted for displaying embroideries, silver-work, sireh sets, and so on, and many interesting exhibits are so packed that they can hardly be seen, and cannot be arranged at all.

c. The question of exhibiting antique articles requires consideration. Assuming that the object of this section is to stimulate native handicrafts, it is a little difficult to see why ancient jewellery should be allowed any prizes at all. In any case old work should be in a separate class, and should not enter into competition with new work at all. For silver-ware it would be as well to provide cases that could be locked so that they need not be removed every evening. The prize-list of Class II of this section for school-exhibits is far too small, and should have many items added to avoid an unwieldy number of exhibits under "Miscellaneous." It would be better another time to give this class more wall-space, and to separate it entirely from the native industries section.

d. As to the construction of the shed for native industries, rough doors or half-doors should be provided so that all entrances but one could be effectually closed at 6 o'clock, and the shed emptied before dark. Plenty of strings should also be fixed between poles and against walls for showing mats. Adequate police arrangements should also be made for clearing the shed, and it should not be left to members of committees to turn people out. Owing to the absence of proper police precautions it was impossible to clear this section before dark, and a certain number of articles are stated to have been stolen. This is a danger to which this section is particularly exposed as many of the exhibits are small and valuable. Arrangements should be made for keeping the ground as dry as possible by digging drains, laying down cinders or sand, and a few coolies should be engaged for each particular section. The want of small supply of labour was much felt, e.g., for clearing up the floor after the exhibits had been arranged, putting up barriers to close entrances, running errands, and stowing away packing cases, and so on. It is no use engaging coolies for the show generally because they are never at hand when wanted. When there are any displays likely to attract a crowd, they should be arranged in a place with one entrance and one exit so that the crowd, can be kept moving in one direction only.

e. Much more care is necessary in the translation of the prize-list into Malay. There were many mistakes which caused annoyance to exhibitors who had been misled by them. For instances under No. 288 the translation implies that the articles must be made out of the trunk of trees. Under 302 the translation means that the exhibits are to be only kriss-sheaths which was perhaps hardly intended. Under 289 and 290 the single word "kabong" or "nibong" is insufficient.

f. Large cards showing the numbers and nature of the classes of exhibits should be prepared beforehand. These are of the greatest assistance in arranging exhibits as they enable the space to be allotted beforehand and any members of committee helping in arrangement can direct exhibitors to the proper place, without difficulty or confusion.

g. It seems advisable to make more definite provision beforehand for landing exhibits and housing exhibitors. On the Tuesday before the opening two tongkangs with exhibits were waiting off the reclamation from early morning till 3 o'clock in the afternoon before landing anything, and many who were expecting to find house accommodation found nothing ready for them. This however is a simple matter which requires only to be thought of, and entrusted to two or three members of committee in plenty of time.

h. The question of the size of committees is worth consideration. There is no object in having a huge general committee and in any case meetings of the general committee should be as few as possible. Beyond general questions such as the choice of site and the date of the exhibition there is no use in assembling the general committee at all, and mischief may easily be done by a large meeting which is easily misled through inexperience, e.g., in this case they very nearly shifted the site at the last minute, and, if they had, the financial result would have been disastrous. Also in sub-committees, appoint two or three men who are likely to work, and let them add to their number if they want to. It is useless to nominate ten men if five have not the time or the inclination to assist, and never come near the place except as visitors with free tickets. "Family tickets" should be abolished altogether.

i. The prize-list might be drawn up something in this way. All models should be cut out of this division altogether. Lace, embroidery and sarongs should come together, krisses and knives, old and new, next. All metal work should form one group, i.e., silver (old), silver (new), sireh sets, brass and tin. The same with all wood-work and carving whether made from coconut trees, kabong, nibong or other wood. Leather-work and rope could go in anywhere, and baskets, mats, hats, bertam work and bird cages should come together as should bricks, tiles and fancy earthenware. Attaps, chicks, and kajangs could come at the end, but would be better accommodated outside the shed altogether. Further there seems to be no sense in making a cast-iron rule that every first prize is to be $10. An exhibit like kajangs is not worth the same prize as a piece of embroidery, nor is a bird-cage worth the same prize as a silver exhibit or a silk sarong. The value of the prizes should certainly bear some relation to the value of the exhibits.

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SINGAPORE MARKET REPORT.

September, 1906.

Articles.	Quantity Sold.	Highest Price.	Lowest Price.
	Tons.	$	$
Coffee—Palembang	...	...	...
Bali	95	20.50	19.50
Liberian	154	22.50	21.50
Copra	1,948	9.20	8.40
Gambier	2,170	7.17½	6.90
Cube Gambier, Nos. 1 & 2	307	11.45	10.75
Gutta Percha, 1st quality	...	300.00	190.00
Medium	...	200.00	100.00
Lower	...	80.00	25.00
Borneo Rubber, 1st, 2nd & 3rd	...	125.00	70.00
Gutta Jelutong	...	6.70	6.37½
Nutmegs, No. 110's	...	32.00	31.00
No. 80's	...	50.00	49.00
Mace, Banda	...	100.00	95.00
Amboyna	...	71.00	66.00
Pepper, Black	578	21.87½	20.80
White (Sarawak)	587	28.12½	27.25
Pearl Sago, Small	92	4.15	4.00
Medium	...	...	...
Large	...	...	...
Sago Flour, No. 1	2,770	2.85	2.65
No. 2	310	1.12½	1.05
Flake Tapioca, Small	315	10.12½	9.45
Medium	50	...	...
Pearl Tapioca, Small	98	9.75	9.40
Medium	404	9.95	9.35
Bullet	...	11.25	11.25
Tin	2,035	97.25	90.75

Exports Telegram to Europe and America.

Fortnight ending 15th September, 1906.

		To.	Tons.
Tin	Str Singapore & Penang	U. Kingdom &/or	1,550
Do	,, do	U. S. A.	925
Do	,, do	Continent	550
Gambier	,, Singapore	Glasgow	—
Do	,, do	London	—
Do	,, do	Liverpool	275
Do	,, do	U. K. &/or Continent	75
Cube Gambier	,, do	United Kingdom	35
Black Pepper	,, do	do	10
Do	,, Penang	do	60
White Pepper	,, Singapore	do	160
Do	,, Penang	do	5
Pearl Sago	,, Singapore	do	50
Sago Flour	,, do	London	50
Do	,, do	Liverpool	1,900
Do	,, do	Glasgow	100
Tapioca Flake	,, Singapore & Penang	United Kingdom	420
T. Prl. & Bull.	,, do	do	450
Tapioca Flour	,, Penang	do	300
Gutta Percha	,, Singapore	do	40
Buffalo Hides	,, do	do	180
Pineapples	,, do	do	1,750 cases
Gambier	,, do	U. S. A.	625
Cube Gambier	,, do	do	30
Black Pepper	,, do	do	85
Do	,, Penang	do	280
White Pepper	,, Singapore	do	55
Do	,, Penang	do	20
Tapioca Pearl	,, Singapore & Penang	do	240
Nutmegs	,, do	do	15
Sago Flour	,, Singapore	do	250
Pineapples	,, do	do	3,500 cases
Do	,, do	Continent	2,500 ,,
Gambier	,, do	South Continent	90
Do	,, do	North do	525
Cube Gambier	,, do	Continent	90
Black Pepper	,, do	South Continent	80
Do	,, do	North do	40
Do	,, Penang	South do	60
Do	,, do	North do	10
White Pepper	,, Singapore	South do	45
Do	,, do	North do	90
Do	,, Penang	South do	30
Do	,, do	North do	10
Copra	,, Singapore & Penang	Marseilles	600
Do	,, do	Odessa	260
Do	,, do	Other S. Continent	260
Do	,, do	North Continent	480
Sago Flour	,, Singapore	Continent	675
Tapioca Flake	,, Singapore & Penang	do	290
Do Pearl	,, do	do	170
Do Flake	,, do	U. S. A.	—
Gambier	Slr do	do	—
Cube Gambier	,, do	do	—
T. Flake & Pearl	,, do	do	—
Sago flour	,, do	do	—
Gambier	,, do	South Continent	—
Copra	,, do	Marseilles	—
Black Pepper	,, do	South Continent	—
White Pepper	,, do	do	—
Do	,, do	U. S. A.	—
Pineapples	,, do	do	—
Nutmegs	,, do	do	—
Black Pepper	,, do	do	—
Do	,, Penang	do	—
White Pepper	,, do	do	—
T. Flake & Pearl	,, do	do	—
Nutmegs	,, do	do	—
Copra	Str Singapore	England	—
tons Gambier	}		1,100
,, Black Pepper			370

Export Telegram to Europe and America.

Fortnight ending 30th September, 1906.

		To.	Tons.
Tin	Str Singapore & Penang	U. Kingdom &/or	1,441
Do	,, do	U. S. A.	300
Do	,, do	Continent	145
Gambier	,, Singapore	Glasgow	—
Do	,, do	London	25
Do	,, do	Liverpool	—
Do	,, do	U. K. &/or Continent	150
Cube Gambier	,, do	United Kingdom	20
Black Pepper	,, do	do	10
Do	,, Penang	do	—
White Pepper	,, Singapore	do	120
Do	,, Penang	do	5
Pearl Sago	,, Singapore	do	35
Sago flour	,, do	London	150
Do	,, do	Liverpool	—
Do	,, do	Glasgow	—
Tapioca Flake	,, Singapore & Penang	United Kingdom	125
T. Prl. & Bull.	,, do	do	240
Tapioca Flour	,, Penang	do	230
Gutta Percha	,, Singapore	do	—
Buffalo Hides	,, do	do	20
Pineapples	,, do	do	—
Gambier	,, do	U. S. A.	250
Cube Gambier	,, do	do	40
Black Pepper	,, do	do	65
Do	,, Penang	do	—
White Pepper	,, Singapore	do	40
Do	,, Penang	do	—
Tapioca Pearl	,, Singapore & Penang	do	40
Nutmegs	,, do	do	10
Sago flour	,, Singapore	do	300
Pineapples	,, do	do	500 cases
Do	,, do	Continent	300 ,,
Gambier	,, do	South Continent	25
Do	,, do	North do	100
Cube Gambier	,, do	Continent	80
Black Pepper	,, do	South Continent	85
Do	,, do	North do	50
Do	,, Penang	South do	20
Do	,, do	North do	30
White Pepper	,, Singapore	South do	5
Do	,, do	North do	90
Do	,, Penang	South do	—
Do	,, do	North do	—
Copra	,, Singapore & Penang	Marseilles	50
Do	,, do	Odessa	—
Do	,, do	Other S. Continent	200
Do	,, do	North Continent	860
Sago Flour	,, Singapore	Continent	175
Tapioca Flake	,, Singapore & Penang	do	70
Do Pearl	,, do	do	40
Do Flake	,, do	U. S. A.	—
Gambier	Str do	do	—
Cube Gambier	,, do	do	—
T. Flake & Pearl	,, do	do	—
Sago Flour	,, do	do	—
Gambier	,, do	South Continent	—
Copra	,, do	Marseilles	—
Black Pepper	,, do	South Continent	—
White Pepper	,, do	do	—
Do	,, do	U. S. A.	—
Pineapples	,, do	do	—
Nutmegs	,, do	do	—
Black Pepper	,, do	do	—
Do	,, Penang	do	—
White Pepper	,, do	do	—
T. Flake & Pearl	,, do	do	—
Nutmegs	,, do	do	—
Copra	Str Singapore	England	—
tons Gambier			1,000
,, Black Pepper			360

GOW, WILSON & STANTON, LTD., INDIAN RUBBER MARKET REPORTS.

13, ROOD LANE, LONDON, E.C. *September 14th, 1906.*

At to-day's auction, 328 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which about 163 were sold. The total weight amounted to about 18¼ tons, Ceylon contributing about 5½ and Straits Settlements nearly 12¾.

The market was steady for grades of the finest description, while for medium and fair kinds the demand was perhaps a trifle better, the enquiry for scrap being more pronounced than during the last sale. The best sheet and biscuits ruled at about 5/6 to 5/7½. Some fine amber coloured crepe offered from the Bukit Rajah Estate, the highest offer made for which was 5/7½ which was refused.

Among Ceylon growths a fine pale crepe from Culloden brought 5/7½.

QUOTATIONS.—

Fine sheet, 5/7.
Fine biscuits, 5/7½.
Good biscuits, 5/6.

Crepe { Fine pale, 5/7½.
Palish to darkish, 4/6 to 4/9.
Dark, 3/6 to 3/9.

Scrap { Fine, 4/6.
Fair to medium, 3/9 to 4/-.
Low, 2/4.

PLANTATION FINE TO-DAY.—5/6 to 5/7½, same period last year, 6/3 to 6/4½.

Do. SCRAP.—3/- to 4/6, same period last year, 3/6 to 5/2½.

FINE HARD PARA (South American).—5/2, same period last year, 5/7.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

163 packages at 4/9 per lb., against 152 packages at 5/1¼ per lb. at last auction.

Particulars and prices as follows :—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Hattangalla	2 cases good pale and palish to darkish biscuits, bought in. 1 case darkish pressed crepe, 4/9.
Ellakande	1 case darkish inferior biscuits, 4/7½. 1 case darkish pressed crepe, 4/8½.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Arapolakande	6 cases good darkish to dark biscuits, bought in. 2 cases inferior, 5/7. 2 cases pressed scrap and rejections, 4/6.
Culloden	11 cases fine pale biscuits, bought in. 3 cases fine pale pressed crepe, 5/7½. 8 cases good darkish pressed crepe, 4/9. 1 case darker, 4/5. 2 cases black, 3/10½. 1 case similar, 3/9. 1 case fine pale to darkish biscuits, bought in. 2 cases good palish to darkish pressed crepe, 4/9.
Nikakotua	2 cases good pale to darkish biscuits, bought in. 1 case good dark biscuits, 5/7.
Kamaradola	2 cases good palish to darkish biscuits, bought in.
C L	8 cases palish mixed scrap, 4/5½. 1 case dark scrap, bought in. 1 bag mixed scrappy biscuits, 3/10. 1 case lumpy rejections, 3/8. 1 case fine pressed Rambong scrap, 4/5½. 3 cases mixed darkished to dark scrap, bought in. 1 case darkish to dark crepe rejections, bought in.
Rosebury	1 case good palish to darkish biscuits and sheet, bought in. 1 case pale to darkish sheet, bought in. 1 bag good palish to dark biscuits, 5/7. 1 bag fair scrap, 4/5. 1 bag dark rejections, 3/6. 1 case mixed inferior scrap, 2/6.
Amblatenne	1 case good darkish biscuits, 5/7. 1 case darker, 5/7. 1 case darkish to dark inferior biscuits, 4/8½. 1 case good palish to darkish scrap, 4/5½. 1 bag rejected biscuits, 3/9. 1 case dark mixed scrap, 4/2½. 1 case inferior scrappy lumps, bought in.
Sorana	1 case very fine palish biscuits, 5/7. 1 bag fine palish biscuits, 5/7. 1 bag very good palish biscuits, 5/7. 1 bag darker, 5/7. 1 bag similar, 5/7.
Waharaka	1 case darkish biscuits, bought in. 1 case palish to darkish scrap, 4/3½.
K M	1 case lumpy scrap, heated, bought in.
Palli	1 case good pale biscuits, bought in. 1 case fair scrap, bought in.
Hapugastenne (Cases marked Galbodde)	1 case palish to dark biscuits, 5/7. 2 case scrap and rejections, 4/4. 1 case lumpy scrap 3/-.
Halgolle	1 case palish scrap, 4/3½. 1 case scrap and rejections, 4/0½. 1 bag badly heated biscuits, 4/6½.
Maddegedera	1 case good palish to darkish scrap, 4/2.
Kutugastota	1 case fine palish scrap, 4/5.
Halwatura (Cases marked Kahagalla)	1 case palish to darkish heated scrap, bought in. 3 cases darkish to black mixed scrap, badly heated, bought in. 1 bag darkish to black rejected biscuits, bought in.
Goonambil	1 case good palish to darkish biscuits, bought in. 1 case good small palish biscuits, bought in. 1 case scrap and rejections, bought in.
Kumbukkan	2 cases fine palish to darkish biscuits, 5/7.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Dangan	2 cases good pale biscuits, bought in. 1 case good darkish to dark biscuits, 5/6½. 1 case darkish lumps, 3/11½.
Kahawatte	1 case rejected biscuits, 5/4.

Straits Settlements.

G M S B	5 cases good darkish sheet, bought in. 1 case pressed rejections, 3/10½.
K P C Ld.	7 cases large darkish biscuits, bought in. 1 case palish to darkish rejected biscuits, 4/6½. 3 cases palish to darkish inferior scrap, 4/3½. 4 cases large palish to darkish biscuits, 5/7¼. 3 cases rejected sheet and biscuits, 4/6¾. 2 cases good palish pressed scrap, 4/5¼.
P R S B	10 cases good dark sheet, bought in. 10 cases mixed scrap and rejections, 4/3.
Jebong	16 cases good darkish scored sheet, bought in. 2 cases pressed rejections, 4/6. 3 cases good palish to darkish scrap, 4/5. 1 case mixed pale to dark sheet, 5/5. 3 cases fine pale to darkish crepe, bought in. 3 cases darker, bought in. 2 cases palish to darkish scrappy crepe, bought in. 1 case black heated crepe, 3/7½. 1 case dark sheet and lumps, 3/7½.
SBRCLd.	7 cases fine darkish sheet, 5/7¼. 2 cases good palish to darkish scrap, 4/6. 1 case rejections in sheet form, bought in.
H E A	1 case mixed darkish rejected biscuits, 4/5½. 1 bag palish to darkish scrap, 4/5.
H E S	1 case very mixed palish to dark scrap, 4/4½.
K M S	1 case scrap and rejections, 4/1¼.
B K A	1 case good palish to dark scrap, 4/5¼.
Highland Est.	5 cases dark to darkish thick crepe, 4/8½. 7 cases darker and inferior, 4/5½.
B N S	4 cases good palish to darkish sheet, bought in. 4 cases somewhat similar, bought in. 1 case good palish to darkish scrap, 4/5¼. 1 case rejected biscuits, 3/10.
S B C CKC	2 cases good palish to darkish cut sheet, 5/6½. 1 case pressed scrap in blocks, bought in.
S P	5 cases good darkish scored sheet, brought in. 1 case good palish to dark sheet, bought in. 1 case inferior, bought in. 1 case inferior darker, bought in. 1 case darkish crepe, bought in. 1 case darker, bought in.
F J R	3 cases dark pressed scrap, bought in.
S P	1 bag dark pressed scrap, bought in.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
C M R E Ld.	3 cases very fine pale crepe, bought in. 10 cases good palish to darkish crepe, 5/6. 11 cases brownish to very dark crepe, bought in. 1 case brown to dark brown crepe, 4/3½.
Beverlac	4 cases palish to darkish pressed scrap, 4/3. 1 case very inferior blackish scrap, bought in.
B R R Co. Ld.	5 cases very fine palish to darkish amber crepe, bought in. 2 cases good darkish to dark crepe, bought in. 17 cases fine thickish pale crepe, bought in. 1 case darkish scrappy crepe, bought in. 1 case good palish crepe, bought in. 1 case inferior darkish crepe, bought in. 6 cases mixed darkish scrappy crepe, 4/3½. 3 cases paler, bought in. 16 cases fine pale to darkish amber crepe, bought in.

Java.

Tjidjeroek	1 case fine thick pressed sheet, bought in. 1 case rolls, bought in.

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Penang.

Abstract of Meteorological Readings for September, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory Penang	29·915	148·4	79·8	88·1	74·1	14·0	77·1	897	74·27	81	N.W.	10·62	2·71

G. LUCY,
Acting Colonial Surgeon, Penang.

PENANG, *12th October, 1906.*

Perak.

Abstract of Meteorological Readings in the various Districts of the State for September, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	..	148	82.73	93	72	21	77.83	888	..	80	..	7.14	1.37
Kuala Kangsar	..	..	79.82	92	72	20	76.17	856	..	85	..	7.94	2.02
Batu Gajah	..	157	81.94	93	72	21	77.21	872	..	81	..	6.41	2.69
Gopeng	..	..	80.40	95	67	28	75.57	823	..	79	..	8.27	1.89
Ipoh	..	..	81.38	92	74	18	77.79	905	..	85	..	5.40	.92
Kampar	..	..	..	92	71	21	..	..	..	..	..	3.22	.58
Teluk Anson	..	..	81.37	92	67	25	77.64	899	..	85	..	6.36	2.25
Tapah	..	..	81.74	93	70	23	76.84	859	..	79	..	7.01	1.74
Parit Buntar	..	..	82.64	90	72	18	77.67	882	..	79	..	10.99	2.65
Bagan Serai	..	..	82.55	91	69	22	79.16	952	..	86	..	8.59	2.83
Selama	..	..	81.24	92	72	20	77.33	887	..	84	..	7.31	1.71

STATE SURGEON'S OFFICE,

Taiping, 10th October, 1906.

S. C. G. FOX,

Ag. State Surgeon, Perak.

Malacca.

Abstract of Meteorological Readings for September, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		ins.	ins.
Durian Daun Hospital...	29·830	154·7	79·1	89·5	69·8	19·7	80·9	1.044	59·5	94	N. W.	7·42	1·08

F. B. CROUCHER,
Colonial Surgeon, Malacca.

MALACCA, *19th October, 1906.*

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for September, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·882	149·7	81·1	90·6	72·4	18·2	76·5	0·828	73·6	77	S.W.	5·25	1·12
Pudoh Gaol Hospital ,, ...	..	..	..	..	..	..	..	..	..	..	..	2·71	1.09
District Hospital ,, ...	..	..	..	..	..	..	..	..	..	..	..	7·75	2·85
,, Klang	..	..	..	89·7	70.0	19·6	..	..	..	..	..	1·18	0·39
,, Kuala Langat	..	..	..	..	..	..	..	..	..	..	..	3·99	1·75
,, Kajang	..	..	..	90.8	72·4	18·4	..	..	..	..	..	9·81	3·06
,, Kuala Selangor	..	..	..	..	..	..	..	..	..	..	..	2·08	0·40
,, Kuala Kubu	..	..	..	..	..	..	..	..	..	..	..	6·23	1·63
,, Serendah	..	..	..	..	..	..	..	..	..	..	..	1·75	0·58
,, Rawang	..	..	..	..	..	..	..	..	..	..	..	4·30	1·00
Beri-beri Hospital Jeram	..	..	..	..	..	..	..	..	..	..	..	2·80	0·69
Sabak Bernam	..	..	..	..	..	..	..	..	..	..	..	4·76	1·24

STATE SURGEON'S OFFICE,
Kuala Lumpur, 12th October, 1906.

E. A. O. TRAVERS,
State Surgeon, Selangor.

Register of Rainfall at Negri Sembilan Hospitals for September, 1906.

Date	Seremban.		K. Pilah.		Tampin.		Jelebu.		Port Dickson.		Mantin.	
	Inches	dcs.	Inches	dcs.	Inches	dcs.	Inches	dcs.	Inches	dcs.	Inches	dcs.
1	..	12	..	04	..	50	..	43	..	46	..	05
2	..	..	..	..	..	..	..	35	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	20	..	..	..	..	..	..
5	..	..	..	51	..	..	..	..	..	..	..	..
6	..	90	..	..	..	..	..	..	..	11	..	07
7	..	42	..	13	..	83	..	..	..	46	..	..
8	..	04	..	..	..	05	..	..	..	..	..	06
9	..	..	..	..	..	..	..	..	..	..	..	..
10	..	12	..	..	..	..	..	..	..	..	..	19
11	..	23	..	10	..	45	..	10	..	70	..	20
12	..	29	..	..	..	40	..	..	..	52	..	28
13	..	60	..	05	..	23	..	..	2	80	..	13
14	..	36	..	04	..	..	..	..	1	44	..	67
15	..	95	..	..	..	..	..	..	..	..	..	31
16	..	..	..	..	..	45	..	..	..	80	..	..
17	..	..	..	..	..	..	..	..	..	..	..	..
18	..	06	..	06	..	40	..	..	..	66	..	16
19	..	..	..	..	..	..	..	..	..	..	..	04
20	..	..	..	..	..	..	..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	06
22	..	35	1	14	..	10	..	22	..	26	..	07
23	..	..	..	..	..	..	..	..	..	16	..	..
24	..	..	..	..	..	..	..	..	..	..	..	31
25	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	07	..	45	..	..	..	..	..	12
27	..	..	..	08	..	75	..	46	..	06	..	31
28	..	40	..	05	..	..	..	..	..	46	..	56
29	..	50	..	..	..	15	..	32	..	10	..	13
30	..	..	..	..	..	..	..	..	..	..	..	..
Total	5	34	2	27	6	96	1	88	8	99	3	72

STATE SURGEON'S OFFICE, SEREMBAN,
11*th October*, 1906.

R. VAN GEYZEL,
Apothecary.

Meteorological Observations.

Table showing the daily results of the reading of Meteorological Observations taken at the General Hospital, Seremban, for the month of September, 1906.

Date.	Temperature of radiation.						Temperature of radiation.				Wind.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Cloud and weather initials.			Rain.
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference sun and shade.	Grass.	Difference shade and radiation.	Direction. 9 H	Direction. 15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	21 H	9 H	15 H	21 H	Inches.
	o	o	o	o	o	o	o	o	o	o			o	o	o	in.	in.	in.	o	o	o							
1	83	86	84.5	86	72	14	137	51	70	2	S.E.	S.E.	75.6	74	74.8	0.888	0.855	0.871	90	68	79	2	2	2	B	B	B	.12
2	77	87	82	87	72	15	140	53	70	2	S.E.	S.E.	75.3	73.9	74.2	.877	.837	.857	94	65	79.5	5	2	0	C	B	B	
3	80	86	83	87	72	15	140	53	70	2	S.E.	S.E.	75	74	75	.867	.855	.861	85	68	71.5	0	0	0	B	B	B	
4	85	86	85.5	88	73	15	144	56	70	3	S.E.	S.E.	70.1	72.8	71.4	.738	.808	.773	61	64	62.5	0	0	0	B	B	B	
5	82	90	86	90	73	17	148	58	70	3	S.E.	S.E.	73.6	73.7	73.6	.830	.833	.831	76	59	67.5	0	2	3	B	B	C	
6	75	84	79.5	85	73	12	137	52	70	3	S.E.	S.E.	71.6	74	72.8	.774	.840	.807	89	72	80.5	10	5	3	R	C	C	.90
7	82	87	84.5	87	72	14	140	53	70	3	S.E.	E	73.6	75.5	74.5	.830	.884	.861	76	69	72.5	2	3	5	B	C	C	.42
8	79	83	81.5	84	72	12	140	56	70	2	S.E.	E	75.6	76.3	75.9	.888	.905	.896	90	80	85	2	3	0	B	C	B	.04
9	79	87	83	88	72	16	145	57	69	3	S.E.	S.E	73.9	73.9	73.9	.839	.837	.838	85	65	75	0	0	0	B	B	B	
10	85	89	87	90	72	18	149	59	70	2	S.	S.	70.1	74.3	72.2	.738	.847	.792	61	61	61	0	0	0	B	B	B	.12
11	85	89	87	91	72	19	149	58	72	0	S.E.	S.E.	70.1	74.3	72.2	.738	.847	.792	61	61	61	0	0	5	B	B	C	.23
12	78	84	81	85	72	13	131	46	71	1	S.E.	E.	74.6	74	74.3	.857	.840	.848	89	72	80	3	5	5	C	C	C	.29
13	85	86	85.5	86	72	14	143	57	70	2	S.E.	S.E.	70.1	74	72	.738	.855	.796	61	68	64.5	3	5	5	C	C	C	.60
14	81	83	81.5	84	72	12	122	38	70	2	S.E.	S.E.	76	74.7	75.3	.897	.856	.876	85	76	80.5	5	5	5	C	C	C	.36
15	82	87	84.5	89	72	17	145	56	68	4	S.E.	S.	75.3	73.9	74.6	.877	.837	.857	80	65	72.5	5	2	5	C	B	C	.95
16	79	85	82	86	73	13	136	50	68	5	E.	S.E.	73.9	70.1	72	.839	.738	.788	85	61	73	2	0	0	B	B	B	
17	80	87	83.5	89	72	17	140	51	69	3	S.E.	S.E.	71.6	73.9	72.7	.775	.837	.806	75	65	70	0	0	0	B	B	B	
18	79	87	83	88	72	16	144	56	69	3	S.E.	S.E.	73.9	75.5	74.7	.839	.884	.861	85	69	77	0	0	2	B	B	B	.06
19	81	83	81.5	86	72	14	137	51	70	2	S.E.	S.E.	76	76.3	76.1	.897	.905	.901	85	80	82.5	2	3	5	B	C	C	
20	85	87	86	89	72	17	148	59	70	2	S.E.	S.E.	73.4	73.9	73.6	.826	.837	.831	68	65	65	0	0	2	B	B	B	
21	83	85	84	86	73	13	138	52	70	3	S.E.	S.E.	74.7	76.7	75.7	.856	.922	.889	76	76	76	0	3	2	B	C	B	
22	85	86	85.5	87	73	14	146	59	70	3	E.	E.	70.1	74	72	.738	.855	.796	61	68	64.5	0	3	5	B	C	C	.35
23	77	84	80.5	85	72	13	137	52	69	3	E.	E.	73.6	74	73.8	.829	.840	.834	89	72	80.5	3	2	2	C	B	B	
24	84	87	85.5	88	72	16	145	57	70	2	E.	S.	72.4	75.5	73.9	.794	.884	.839	68	65	66.5	2	0	2	B	B	B	
25	84	90	87	82	72	10	136	54	69	3	S.E.	S.E.	74	73.7	73.8	.840	.883	.836	72	59	65.5	0	0	2	B	B	B	
26	85	86	86.5	88	71	17	137	49	68	3	S.	S.	70.1	76	73	.738	.904	.821	61	72	66.5	0	0	0	B	B	B	
27	86	90	88	92	72	20	140	48	69	3	E.	E.	74	75.4	74.7	.855	.880	.867	68	62	65	0	0	0	B	B	B	
28	85	82	83.5	87	74	13	139	52	70	4	E.	S.E.	73.4	75.3	74.3	.826	.877	.851	68	80	74	2	3	5	B	C	C	
29	82	86	84	87	72	15	130	43	70	2	S.E.	E.	73.6	74	73.8	.830	.855	.842	76	68	72	3	10	5	C	R	C	.40
30	81	85	83	86	72	14	123	37	70	2	E.	E.	76	70.1	73	.897	.738	.817	85	61	73	3	5	5	C	C	C	.50

TOTAL ... 5.34

STATE SURGEON'S OFFICE, SEREMBAN,
10th October, 1906.

R. VAN GEYZEL,
Apothecary.

SINGAPORE:
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AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

EDITED BY
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NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, etc. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valuation regarding new or little known natural or manufactured products of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M. A., F. R. S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given.

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

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SYNTHETIC RUBBER.

At the meeting of the British Association this year at York, Professor WYNDHAM DUNSTAN delivered an important address on "Some Imperial Aspects of applied Chemistry" in which he shows, the importance of Chemical Science to the Agriculturist and that especially in the tropical portion of the empire, and points out the pressing need that the Imperial Government should recognize more fully than it has done, and at least as fully as foreign Governments are already doing the claims of scientific investigation to be regarded as the essential first step in the material and commercial development of our possessions. The same feeling runs through all the introductory addresses of the Association as yet published, and will be strongly endorsed by all thinkers. But to readers in the Eastern tropics his account of the chemistry of rubber will be of more special interest. He says—There is no more important group of questions demanding attention from the chemist at the present time than those connected with the production of India rubber or Caoutchouc. An enormous increase in the demand for India-rubber has taken place in the last few years and last year the production was not less than 60,000 tons. Till recently the supply of rubber came chiefly from two sources, the forests of Brazil which contain the tree known as *Hevea braziliensis* the Para-rubber of commerce and the forests of Africa where climbing plants chiefly of the Landolphia class also furnish rubber. The increase demand for Caoutchouc has led to the extensive planting of the Para-rubber tree especially in Ceylon and in the Federated Malay States. Systematic cultivation and improved method of preparation are responsible for the fact that the product of the cultivated tree is now commanding a higher price than the product of the wild Brazil. It is estimated that within the next seven years the exports of cultivated rubber from Ceylon and the Federated Malay States will reach between ten and fifteen million pounds annually and that after fifteen years they may exceed the exports of the so called wild rubber of Brazil.

The services which chemistry can render to the elucidation of the problems of rubber production and utilization are very numerous. Methods of treatment depending on a knowledge of the other constituents of the latex have led to the production of rubber in a purer condition. Much still remains to be elucidated by chemical means as to the nature of the remarkable coagulation of the latex. As is well known the latex is a watery fluid resembling milk in appearance which contains the rubber, or as I think more probable the immediate precursor of rubber together with proteids and other minor constituents. The constituent furnishing rubber is in suspension and rises like cream when latex is at rest. On the addition of an acid or sometimes of alkali or even on mere exposure coagulation takes place, and the rubber separates as a solid, the other constituents for the most part remaining dissolved in the aqueous liquid or serum. The first view of the nature of the coagulation process was that like the coagulation of milk by acids it is dependent upon a process of proteid coagulation, the separated proteids carrying down the rubber during precipitation. This explanation cannot, however, be considered complete by the chemist and there are peculiarities connected with the coagulation of the latex which are opposed to the view that it is wholly explained by the associated proteids. The experimental investigation of the question on the chemical side is beset with many difficulties which are increased if access cannot be had to fresh latex. A number of experiments were made at the Imperial Institute with latex forwarded from India. The difficulties contended with in preventing coagulation during transit were great, but in the case of the latex derived from certain plants there were to some extent surmounted and the results obtained especially with reference to the behaviour of certain solvents towards the latex led to the conclusion that coagulation can take place after removal of the proteids and that it is in all probability the result of the polymerization of a liquid which is held in suspension in the latex and on polymerization changes into the solid colloid which we know as Caoutchouc. Although the nature of the process is not yet completely elucidated there is little room for doubt that the coagulation is due to the polymerization of a liquid and probably of a liquid hydrocarbon contained in the latex.

The chemical nature of Caoutchouc is a subject which has attracted the attention of distinguished chemists from the middle of the 18th century, among them being FARADAY, LIEBIG and DALTON. FARADAY was the first to examine the constituents of the latex of *Hevea braziliensis*. It is only in recent years that our knowledge of the constitution of organic compounds and especially of the terpene group, has rendered it possible to make any great advance. It is interesting to record that GREVILLE WILLIAMS in 1860 made the most important contributions to this subject. He identified a new hydrocarbon isoprene as a decomposition product of Caoutchouc and recognised its polymeric relation to Caoutchouc.

There are strong arguments for view that the constitution of the parent substance present in the latex is nearly related to that of isoprene————. To WALLACH and also to TILDEN is due the important observation that when isoprene prepared from oil of turpentine is kept for sometime, it gradually passes into a substance having all the characteristic properties of Caoutchouc." Professor DUNSTAN then points out that chemistry holds the key to the future of the rubber industries in all their phases. "The discovery of better methods of coagulation, preparation and purification will be effected through chemical investigation as will also the determination of the manner of utilizings the various other plants which furnish rubber like latices. That the physical properties of raw rubber on which its technical value depends are to be correlated with the chemical composition of the material there can be no doubt. The chemical analysis of raw rubber as at present conducted is however not always to be taken by itself as a trustworthy criterion of quality and more refined processes of analysis are now needed. Although the finest Caoutchouc for technical purposes is only yielded by some half-a-dozen plants under the name of which these varieties of Caoutchouc pass there can scarcely be a doubt that the elastic substance in each case possesses a very similar if not identical chemical structure. Nearly all the latices and similar fluids supplied by plants contain more or less Caoutchouc. Even opium, the dried juice of the capsule of the poppy contains Caoutchouc, whilst the opium yielded by certain Indian species contains a notable proportion. Chemistry must determine the means by which Caoutchouc can best be separated from these relatively poor latices. In view of the increasing production of the nearly pure Caoutchouc which is furnished by *Hevea*, *Funtumia*, *Castilloa* and *Ficus elastica*, and a few other plants which occur or can be cultivated in several of our tropical possessions, the question is not a pressing one at the moment.

The production of Caoutchouc by chemical means has been virtually accomplished in its formation from isoprene. The exact nature of this change has still to be determined. When this has been done it will only remain to cheapen the cost of production, to make the manufacture of synthetic rubber a purely practical problem.

It has to be remembered that the actual cost of producing raw rubber which is at present about a shilling a pound will probably be reduced and the market price of rubber may be so considerably lowered that as with quinine the synthetic production could not profitably be carried on. Chemists may, however, confidently predict that before the British Association again meets at York, the synthetic production of rubber will be a fully accomplished fact."

He then refers to the vulcanising of rubber and to the recent experiments of Mr. BAMBER in vulcanising fresh latex, and says that if this proves to be practicable it may mean the transference to the tropics of the vulcanizing industry.

I have quoted at length from this very important and interesting paper, not only because of its intrinsic interest, but because it so frequently happens that persons interested in rubber or other industries frequently see only a garbled account of such investigations as have been made on the subject, in daily journals whose correspondents do not fully understand what has been said.

There are two main points in the paper, one that chemistry may, ere long, be able to utilize the small quantities of Caoutchouc known to occur in other plants beside the well-known four or five important rubber plants; and second that it may be possible to make rubber synthetically.

For the first point to be one of real practical importance it would be necessary to find a plant which produces latex containing rubber which can be more easily grown and produces so much latex that even the small quantity of Caoutchouc it contains will be sufficient for it to compete with say *Hevea braziliensis*. Thus say a latex contains ⅛ the amount of Caoutchouc produced by *Hevea*, the plant would have to produce more than 8 times the amount of latex to compete, as the extraction of the rubber from this thin latex would obviously cost more than from the richer latex. It is hardly probable that this would be discovered now. Still other latices might be utilized in a small way, such as those of the Jack tree, which might possibly pay extraction in some parts of the world. But a discovery of this nature, *i e.*, of a method of utilizing the sticky immature rubber, or viscin as it is commonly called, would be of some importance to the Para-rubber planter, for by it he would be able to utilize the thin sticky rubber from leaves and twigs of his Para-trees and the tappings from the nursery beds, so that on the whole any such discovery, almost certain to be made would rather benefit him than injure his business.

Synthetic rubber has been the bogy of many would-be investors of rubber, and no question is more often asked than is it likely that synthetic rubber will soon be invented, and the plantations ruined. As Professor DUNSTAN writes: " Rubber having all the qualities of good Caoutchouc has been made from isoprene, which has been prepared from oil of turpentine. ,, It surely needs hardly any pointing out that the slow growing expensive turpentine trees, inhabitants of cold climates where labour is extremely costly could not for a minute compete against the rapid growing Para-rubber tree in a climate where labour is cheap, especially when from the *Hevea* we get the rubber fully prepared when the latex is drawn from the tree, whereas in the turpentine tree after drawing off the turpentine it has to be made into isoprene and then into rubber. Isoprene must be made far more cheaply than in this way to compete with Para-rubber. It is certain that we shall be able to lower the cost of the production of rubber very considerably in the next few years, perhaps to little more than half its present cost. Can any substance be found from which isoprene or any other hydrocarbon convertible into rubber can be obtained and converted at a cheaper rate ?. This is hardly probable.

The vulcanization of latex at which Mr. BAMBER has been working, was a subject of discussion many years ago in the Straits Its commercial practicability depends on the possibility of starting manufactories of rubber goods on a large scale in the rubber districts. It is notorious that there are practically no large manufactories in any part of the tropics. All or nearly all attempts at starting anything except strictly local manufactures even in the most suitable localities have proved complete failures. The continuous work in one place does not suit the Oriental at all, least of all the Cingalese, Chinese and Malay, the workers of the rubber region in the East. Till the manufacturing classes of Europe can be so acclimatized as to settle in the hot damp rubber regions and without deterioration of character and stamina populate the equatorial belt, it is not at all probable that any large manufactories of vulcanized goods will ever become practicable here.

I may conclude these notes by calling attention to the immense amount of invaluable botanical chemistry already done by the Scientific Department of the Imperial Institute for the Empire and particularly the Colonial portion of it. The requirements of research into the chemistry of plants and of the raw products of the tropics, and also of scientific agriculture in all our possessions, are enormous, the scanty and tardy recognition of their importance to the whole empire by the Government ludicrously meagre, but it is satisfactory to see that at length some appreciation of this work is being felt, and Professor DUNSTAN'S Laboratories at the Imperial Institute are leading the way to a full knowledge of our resources and the way to use them.

H. N. R.

DESTRUCTION OF RATS IN COCHIN-CHINA.

An article by M. QUESNEL in the *Journal d'Agriculture Tropicale* on this subject is worth attention as the plague of rats in the paddy-fields is often very destructive in the Peninsula. The experiments were made with the *Danysz Virus* which has been tried here and in Java without success. M. QUESNEL attributes this to the deterioration of the Virus on its way out to the East. In one case the Virus proved successful, a crab was opened and some Virus put beneath the carapace, which was closed again, and the crab put on a pile of rubbish between a garden and a paddy-field. Next day an enormous rat was found dead by each crab and two more in the mouths of their burrows in the rice-fields. One Virus tube was enough for from 50 to 100 crabs. It is suggested that the Virus should be used when the rice-fields are flooded and the rats have taken refuge in the higher ground of the mounds in the flooded area. Except in the instance given above the use of *Danysz Virus* does not seem to have been any more successful than it has in Java and Perak.

An Annamite method of catching rats is also described. At some spot in a rice-field a pile is made of alternate layers of brushwood and straw to 5 or 6 feet in height. Baits of crabs, fruits, etc. are put in and the pile left for 8 to 15 days. It is then surrounded with a close bamboo screen, of about 6 feet tall, and the natives then begin to throw the sticks and straw outside the enclosure killing the rats collected there as they try to escape. Two or three hundred can be killed at a time in this way, at no expense, and the enclosure can be carried round to each pile of brushwood in turn.

The plan seems a good one and might be used in our paddy lands here.

H. N. R.

RAMBONG CULTIVATION IN THE MEDITERRANEAN.

The demand for rubber of all kinds and the general interest in its cultivation has induced several cultivators to try the cultivation of *Ficus elastica,* in Egypt, Algeria and Sicily, with more or less satisfactory results. From the *Journal of Tropical Agriculture,* we find that M. BARZI of the Botanic Gardens, Palermo, has been experimenting with this plant, and has published a report on the results; all the trees he has produce rubber and of good quality. The plant, however, produces few aerial roots, in Palermo, (one has noticed that the Rambong is very variable in this matter), so that as the plants are rather smaller than in the tropics they are planted there only ½ foot (4 metres) apart. In Algiers, at Hamma, M. CH. RIVIERE has obtained 14 francs a kilo for his rubber produced there, about 5 shillings and 4*d.* a pound. Unfortunately the production of the rubber is very scanty there.

In Egypt, at Cairo, the tree was introduced by M. FLOYER, as a roadside tree in the hopes that it would produce good rubber as well, which it apparently does. Accounts of its behaviour were published in the Kew Bulletin in 1901 and following years, and M. FAVRE has published notes on it also in the *Journal d' Agriculture Tropicale.*

ZEDOARY STARCH.

A note on the preparation of this is published in the *Journal of the Agri-Horticultural Society* of Western India, and as the plant is common in waste ground here it may be of interest to some of our readers. "The plants are dug up in January (in India) and the tubers are cut into as small slices as possible. These are put into water and crushed by the hand. The solution is allowed to stand one night during this time, the starch goes to the bottom of the vessel in which the solution stands. Then the slices and water is taken away gently into another vessel, the process of crushing the slices being similarly repeated and the solution allowed to stand for another night, if the tubers are washed clean before being cut into pieces the starch will be exceedingly fine and white, if not it will have to be washed in water some three or four times. The starch is sold at 6 to 8 Annas a lb. in the Konkan. It is mainly used for culinary purposes on fast days when ordinary food is not taken. It is also given as a tonic to weak person when boiled in milk".

The Zedoary *Curcuma Zedoaria* is known here as Tema Lawang and is one of those half-wild scitamineæ which occur in villages and waste ground. It has broad bright green leaves with a purple brown splash in the centre, and when it flowers produces a large and beautiful cone of bracts green in the lower part and violet purple above. The rhizomes, are used here chiefly in curries and native medicines, having an aromatic scent and taste. It can be cultivated like ginger by breaking up the rhizomes, and grows readily almost anywhere.

H. N. R.

ANALYSES OF VARIOUS RUBBERS.

In the Annual Report of the Indian Museum 1905-1906, are some analyses of various rubbers by Mr. D. HOOPER among them is a rubber from Mannvo, Burmah (kind not stated possibly Para.) which gave Caoutchouc 96·7, resin 2·3, ash 1·1. Ceara Rubber from Poona gave Caoutchouc 94·6, resin 2·1, ash 3·3. *Parameria glandulifera*, from the Andamans, Caoutchouc 92·5, resin 6·4, ash 1·0. This latter apocynaceous climber is not usually considered one of the first class rubber vines, but it is perhaps one of the best of the Paramerias and this analysis gives it as a better class of rubber than that of *Ficus elastica.*

Analyses of the rubbers of 7 Indian Ficus are given, beginning with a rather poor *F. elastica,* Caoutchouc 87·5, resin 10·7, ash 1·8. The others vary in analysis from 30·8 Caoutchouc and 58·9 resin (*Ficus Benjamina*, the waringin) to 12·5 Caoutchouc and 84·8 (*Ficus religiosa,* the Peepul tree) 12·5 Caoutchouc and 84·7 resin.

Some *Artocarpi* gums were also examined. They were very poor in Caoutchouc, *A. hirsuta*, gave the highest amount, Caoutchouc 28·0, resin 71·0.

Jack (*A. integrifolia*) gave only 7·7 with 90·3 resin. It is hardly likely that any of these latices will come into use as rubber producers. A number of laticiferous plants of other orders, *Euphorbias Calotropis, Thevetia, Pedilanthus,* were investigated also and substances more or less allied to Caoutchouc obtained, but of practically no commercial value.

H. N. R.

RUBBER NOTES.

Ecuador—From the Consular report of Ecuador for 1905, we read that the Government passed a law that a premium of ten cents is to be paid by Government on all plantations of rubber trees as soon as they reach the age of five years. The premium alone would be a very small inducement to plant, but the high prices of rubber induce the making of extensive plantations.

Imports into New York—The increase in imports of crude rubber is steadily maintained. The supply from Brazil remained about the same in quantity but that from most other countries showed an increase. The imports of gutta "joolatong" (*i.e.* jelutong) nearly doubled and the value rose from £93,000 in 1904 to £177,000 in 1905".

This jelutong comes now largely from Sumatra, as well as Borneo. M. GUSTAV FISCHER of Palembang tells me the Sumatran jelutong is preferred by dealers now. He has been tapping trees after the style used in Para-rubber trees and is obtaining improved samples. The tree is abundant in the Peninsula but seems here to be quite neglected.

H. N. R.

RAMIE AGAIN.

Mr. EDWARDS RADCLIFFE is still perseveringly urging the claims of Ramie as a cultivated plant to take the place of cotton, and has circulated a letter offering to place his process of manufacture at the disposal of any planter, the only condition being that the planter pays him a royalty, or as he expresses it he will help the planter to exploit Ramie on the no cure no pay principle. With this circular he sends samples of very fine Ramie silk, and also an Article from the British Trade Review, illustrated by a picture of its growth in five months, apparently 8 or 9 feet tall. I think this can hardly be reckoned as an average growth of the plant, at least in this part of the world.

The article is long and naturally gives much that is known to all, but some statements seem rather too sanguine. Thus "Ramie fetches to-day £32 a ton, I have had to pay as much as £40 though I have bought as low as £18." *I am informed it can be grown at an average price of £7 to £8.* I know the Natives in Asiatic countries are satisfied and make a profit on £10. The best proof of that it is a profitable crop I gather from Chinese sources. I am informed it costs about £7 to grow Ramie in Asiatic Countries and the Chinaman sells his crop for £12 or £14 a ton. An eminent authority tells me it can be grown to sell at a profit for £10." That is to say, about $5 a pikul. Now Ramie is far from a cheap plant to grow. It requires a good deal of labour, good soil and heavy manuring, to make it grow at all well.

It requires a very considerable area to produce a pikul, and five dollars worth of manure, would not go very far towards manuring this. Where is any possible profit to come from in £10 a ton?"

It was on absurd figures like those given by Mr. RADCLIFFE that the estimates of the profit was based and which probably induced the buyers in the early days of the recent attempts to push Ramie to the front, to offer £12 and £15 a ton. It may be well doubted that Ramie can be produced in any country where labour is not excessively cheap, at much less than £30 per ton.

Mr. RADCLIFFE wishes it to be thoroughly understood that he is not posing as an expert agriculturist, on the contrary he feels so much harm has been done by the indiscriminate publication of reports even under Government sanction that he wishes to repair some of the mischief that has resulted. "The so-called reports issued by Botanic Gardens are mostly prepared from Laboratory experiments after plants have been nursed often under conditions that are quite unnatural and of course useless as far as practical results are concerned. We should rather urge our Colonies to start experimental patches." This quotation gives the readers a very fair idea of Mr. RADCLIFFE'S knowledge as to what has been done in Ramie cultivation by Botanic Gardens, experimental stations and planters.

It is suggested to start a Ramie Association like the Cotton-growers Association to encourage the cultivation, trade and manufacture of Ramie. This idea is a good one, but it will be essential first for the Association to send some capable man to the various Colonies to see what has been tried and why it has failed so constantly and why so much money has been lost on a fibre which according to Mr. RADCLIFFE can be grown almost anywhere at a cost of less than £7 a ton, and can be sold at £40.

Ramie may have a big future before it, but as it will not have any till the buyer realizes that it is not possible to grow it at anything like the figures given by Mr. RADCLIFFE and are prepared to pay a reasonable price for one of the most valuable fibres in the world.

CASHEW NUTS.

We have received a letter and samples of the seed of the Cashew nut, (*Anacardium Occidentale*), Malay "Gajus"; from Mr GUIOT, of Aix en Provence, France, who asks if it would not be possible to open up a trade in this product here. The best time for the sale is in September or the latest in October in Marseilles. He would be glad to take at first 10,000 kilos, and considers that the demand would rapidly increase. He offers good references to any who will tranship them to him.

The Cashew nut is not uncommon in Pahang, near Pekan, and in other places along the Coast. I am not acquainted with any place where it is really abundant enough to supply any very large amount of kernels. Perhaps some of our readers know where and how this nut can be procured in quantity, and would care to put themselves in communication with Mr. GUIOT.

H. N. R.

Mr. Herbert Wright's Lecture at Ratnapura.

SIR,—Allow me the space in your columns to make the following comments upon Mr. WRIGHT'S lecture on rubber recently delivered at Ratnapura.

A most interesting and obscure point was raised by him *re* the connection of the laticiferous system to the vital processes of the plant; as this is a subject of profound practical interest it will not be out of place to inquire into that connection.

Mr. Wright, in alluding to the feeding of the laticiferous system, referred to a section of interest in that apposition was seen on the part of a milk tube with a vessel in the young wood. The question to begin with is, what is latex? It is generally thought to be a waste product, but an analysis of latex (in *F. elastica*) shows that it contains proteids, carbohydrates, the emulsion being due to the suspension of the "rubber element" in the mother fluid.

It is interesting to know why a single species plant requires such a large system for the storage of its products, while the general tendency of plants do not point in the same direction.

As pointed out the latex tubes occur in the "bark" in the rubber tree and do not encroach upon the xylem. If we turn to other trees we see that the tree as a whole takes part in the deposition of its waste products. Thus in Pinus the resin passages occur in secondary xylem, while in other plants raphides are seen deposited in the vessels of the plant. Besides it is interesting from this point of view to recall that distinct milk passages can be observed in the stipules of the *F. elastica*, and we know that of all forms of modified leaf the stipules come nearest the original.

Let us inquire whether there are any data for suggesting that latex may be in *its earlier stages* a food for the plant. We know that in all green-leafed plants *starch* granules can be seen in the guard-cells round each stomata. There is reason to believe that the change of carbon dioxide to starch takes place through the intermediation of the formation of prenic aldehyde, the later stages being only concerned with hydrolyses and polymerisations, two processes easily attained in the plant owing to the large cell surfaces involved.

Pushing this physiological fact further we know that the starch can be used by the organism only as sugar, and the excess of starch is deposited in various parts of the tree.

Keeping in mind the properties of living protoplasm in the direction of selection and polymerisation it is not difficult to imagine that the carbon dioxide may be changed to a member of the acetylene series, Isoprene either directly by the phenomena of hydrolysis and polymerisation or by more complex changes.

We know as a matter of fact that the decomposition products of rubber give isoprene and levulinic acid, of which more anon. Isoprene, though of the open series of carbon compounds, like the other members of its series, readily polymerises to dipentene of the terpenes and of the closed or ring carbon compounds; the formula for dipentene is $(C_{10}H_{16}$; now on the distillation of the "rubber element" Caoutchouc we get the identical isoprene and dipentene and the formula (empiric) of Caoutchouc is $(C_{10}H_{16})n$: This is of importance as showing that Caoutchouc is a polymer of dipentene.

I hope we see the direct connection of isoprene with Caoutchouc, the latter being only the product of a series of polymerisations of the former, the only link in the evidence that is wanting is to understand how CO_2 goes into isoprene $C_5 H_8$, but in extenuation it may be urged that it is as difficult to show how CO_2 goes to H. C. H. O. that is formic aldehyde. Granted this change takes place primary to or secondary (which is of course more likely) to the formation of starch in the leaf, we then must consider the mode of flow of what now we must look upon as elaborated food material.

We know that the latex tubes of Hevea are placed in the "bark" outside the cambium. So is it with the true vessels; so that we may look upon the laticiferous system as a modified system of "vessels" in the bark.

It was pointed out in the lecture that even "terrible mutilation" of the bark did not seem to affect the condition of the tree. How is this possible? There may be some vessels intact in a tree of the above description, but by far the larger majority are sure to be destroyed, so that we must expect the tree to suffer. It has been shown that a ring cut round a tree to the cambium materially alters its condition. In view of these facts we are irresistibly driven to the conclusion that the plant must be having a secondary or reserve process of nutrition. Suppose that the reserve material is the latex in its *earlier* stages. If now the bark be removed the latex by reverse chemical changes may supply food to the tree, and if tapped while the bark is badly mutilated and so incapable of properly nourishing the tree we would naturally expect a decrease of the amount of latex obtainable, or a decrease in its rubber element, though the quantity may be but little influenced, and this seems to be so.

I would not maintain, though I have suggested it, that the milk is formed direct in the leaf; it would be more correct to presume that the formic aldehyde *instead* of polymerising to starch takes a different course and gets finally reduced to Caoutchouc. Let us see what other circumstances are there that may be explainable in the above light. What would be the effect (1) of continuous tapping? The rubber element will be decreased owing to the fact that the formed compounds require *time* to polymerise, perhaps Caoutchouc is a product formed of the polymerisation of the other substances while stagnant in the laticiferous system itself. If on the other hand (2) the tapping is delayed, the Caoutchouc may have polymerised into a more stable substance and we know chemically that pure Caoutchouc, when obtained by dissolving the crude substance in chloroform and precipitating with alcohol, absorbs oxygen when exposed.

The general conclusion that can be drawn from the above observation is that undue mutilation of the bark may be fatal to the quantity of rubber in latex, and that as long as the tree is in healthy condition in a proper soil the latex may be entirely withdrawn without vitally affecting the physiological process of the plant. The whole process of the formation of rubber may be summed up by saying that it is a more or less catalytic action, or to be more accurate surface action; for the re-acting substances to be intimately connected it is necessary that they be exposed to a large surface as is found in the structure of a tree by means of this solution; hence we see that capacity for osmosis must exist between the laticiferous system and the vessels, as was shown in the section referred to by Mr. WRIGHT.

It is not easy to explain why it is that such a system exists. It may be that the habitat of the plant and its environment may have caused this change. The amount of water transpired by a tree must partially depend upon the capacity of the atmosphere to take up moisture, or the amount of water transpired will be lessened with the increasing humidity of the atmosphere. In the Amazon Valley where the plant flourishes, the atmosphere must be surcharged with moisture so that a large quantity of water is thrown into the food circulation of the tree, and this water may be indirectly responsible, as we have seen, for the abnormal polymerisation of the products of assimilation. It is a bold venture to say so (as I know nothing of it myself), because in that cause laticiferous trees must (not necessarily in *all* cases) be indigenous in places of warmth and humidity. Hence places with a larger rainfall and warmth (for without heat the water will be incapable of being vaporised) must evidently succeed better in the growing of the tree.

If also the soil be dry the transpiration current will be small, the transpiration will also be small, and so the amount of the latex and its percentage of rubber must be smaller than in the other case, and the reverse will also be true.

It was noticed by Mr. WRIGHT that an apparently dead tree may yield latex, but we must here recall the recent work of SCHWALSBURGER, who showed that *transpiration* current may or rather really does take place in a *dead* tree, so that though the activity of formation of the primary products of assimilation may fail it does not follow as a logical sequence that the activity of formation of the secondary polysen also fails, especially as polymerisation is a process purely chemico-physical in some cases; the water requisite is present, being supplied by the osmosis taking place from the transpiration current, the re-acting surface is present, the products of primary assimilation are also present, so that latex may form. Lastly, from what has been said previously as regards tapping there must be an *optimum* time when the formation of Caoutchouc is finished, but before it has itself polymerised. As regards the age for tapping it must be evident that when the plant is young the processes of life are quickened so that the products formed must *all* be subservient to the main requirement—*viz.*, the growth of the tree, so that even if latex is obtained it would be unwise to tap it.

I have ventured to bring forward a bold idea, and out of justice to myself, I must say it is only a plausible idea, and, as ideas are often, may be all wrong, but one experiment which I cannot per-form may be pointed out; if what I said *re* the formation of latex with regard to the transpiration of trees be correct, it would be interesting to see whether the judicious cropping off of some of the leaves will have any effect on the amount of latex.—I am, etc.

ISOPRENE.

(In *Times of Ceylon.*)

COLOMBO, *August* 31*st.*

P.S.—Just as I think of posting this letter, I see a para. in your paper *re* the formation of rubber by polymerisation from a precursor. The comparison of what I suggest and what Professor DUNSTAN says is at least interesting.

TAPPING OF PARA RUBBER TREES ON PENANG HILL.

The following results of certain tappings of Para-rubber trees in the old Experimental Garden on Penang Hill at an elevation of 2,000 feet may be of interest, as no trees at this altitude appear to exist elsewhere in the Colony.

The Garden has been abandoned but on my learning of the existence of the trees, I gave instructions that some should be tapped. The experiments were entirely carried out by MOHD. HANIF, the Overseer of the Botanic Gardens, who has had some experience of the work.

Owing to the decision to close the Garden the land has become considerably overgrown with small jungle trees, shrubs and ferns, and the trees have had no special care for some time past. There are about 14 trees on the land planted from 30 to 40 feet apart and 4 were selected near the road to Government Hill. Their age is about 12 years and they stand on a slope about 50°.

The Overseer adopted the herring-bone method and made the incisions about 2 feet above the ground. The centre groove was 2 feet long and the side grooves, 3 on each side, 6 inches long.

In the first 3 trees, two sets of incisions were made and in the 4th tree 3 sets, carpenter's chisel being used for the purpose. The tappings were made on alternate days, 14 in all, between July 11th and August 6th, about 8 or 9 a. m.

The rubber obtained was thoroughly dried and weighed on the 15th September, the results being shown in Table *A*.

The girth of the trees is shown in Table *B*. The average Minimum temperature in the shade during the period of the experiments was 65·9° and the average Maximum 78° while the average Maximum in the sun was 124°.

The total Rainfall during the time was about 3 inches, but there had been a fall of 2·65 inches on the day before the tapping was commenced.

W. PEEL,
Acting Superintendent of Gardens.

PENANG, 21*st September*, 1906.

Table A.

Date of Tapping.		Tree I	Tree II	Tree III	Tree IV	Total.
July	11	¾ oz.	¼ oz.	¾ oz.	1¼ oz.	3 oz.
,,	13	1¼	½	1	1¼	4
,,	15	2	½	1½	2	6
,,	17	1¼	1	1½	3¼	7
,,	19	2½	1½	2	3½	9½
,,	21	1	½	1¾	3¼	6½
,,	23	1	½	1½	3¼	6¼
,,	25	1	½	1½	4	7
,,	27	1¼	¾	2	4	8
,,	29	1½	1	2	3¾	8¼
,,	31	1½	1	2½	3½	8½
Aug.	2	1¼	1	2	3½	7¾
,,	4	2½	1¼	1½	6	11¼
,,	6	1½	1¼	2¾	3½	9
Total ...		1 lb. 4¼ oz.	11½ oz.	1 lb. 8¼ oz.	2 lb. 14 oz.	6 lb. 6 oz.

Note.—Five and a half oz. of scrap were collected also from the 4 trees.

Table B.

GIRTH.	Tree I	Tree II	Tree III	Tree IV
At 3 ft. from ground	2 ft. 8½ in.	2 ft. 11½ in.	2 ft. 4¼ in.	4 ft. 9¾ in.
At 5 ft. from ground	2 ft. 5½ in.	2 ft. 8¼ in.	2 ft. 11⅝ in.	4 ft. 2⅛ in.

STRAITS RUBBER AT THE CEYLON SHOW.

The report of the exhibits of rubber at the Ceylon Show held this month have not come to hand as yet, as the Show was only held this month, but we have heard some facts about the exhibits. All will be glad to hear that Mr. PEARS of Lanadron Estate has carried off several prizes for his block rubber, which took prizes also at the recent Agricultural Show in Singapore and which took the highest price in the home markets. The Malay Peninsula scored also in several of the other exhibits. Visitors stated that the Show seemed to be chiefly Malay, for the samples sent from the Peninsula were of large size, while those from Ceylon were in small lots. Most of the Ceylon rubber too appears to have been in biscuit form, a form which has nearly died out in the Peninsula before the crepe, block and sheet, and we notice in the latest report from GOW, WILSON AND STANTON, fifteen lots of biscuits, one lot of sheet and five of crepe were sold from Ceylon at the last auction while there was only two lots of biscuit, thirty lots of crepe and fourteen of sheet, and one of block sent at the same time from the Straits.

We shall hope to give a full account of the Show in next number of the Bulletin.

H. N. R.

GOW, WILSON & STANTON, LIMITED—
India Rubber Market Report.

13, ROOD LANE, LONDON, E. C.
31*st August*, 1906.

At to-day's auction, 312 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which about 152 were sold. The total weight amounted to 15 tons, Ceylon contributing about 4 and Straits Settlements nearly 11.

The finest qualities met with fair attention, though the prices offered were frequently below sellers limits. 5/8 was the ruling price for the best biscuits and sheet, and for finest crape about ½*d.* less was the current idea.

Some excellently prepared rubber was shown by the Lanadron Muar Estate, and comprised 7 cases of strong pressed blocks of very pure quality. The Bukit Raja Rubber Co. also had 16 full sized cases of choice amber crape, and for these 5/8 was refused.

Warriapolla headed the Ceylon list with a price of 5/8 for a small case of well prepared pale biscuits of excellent quality.

QUOTATIONS.—Fine sheet, 5/8.
Fine biscuits, 5/8.
Good biscuits, 5/6.

Crape { Fine pale, 5/7½.
Palish to darkish, 4/3 to 4/6.
Dark, 3/4 to 3/7. }
Fine Rambong, 4/3½.
Scrap { Fine, 4/6.
Fair to medium, 3/6.
Low, 2/4. }

PLANTATION FINE TO-DAY.—5/8 to 5/9, same period last year, 6/- to 6/3.

DO. Scrap, 3/- to 4/6, same period last year, 3/3 to 5/5.

FINE HARD PARA (South American) 5/2, same period last year, 5/7.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

152 packages at 5/1¼ per lb., against 189 packages at 5/3¾ per lb. at last auction.

Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
K M	1 case good palish to darkish sheet, 5/7. 1 case good darkish biscuits, 5/7. 1 case good small biscuits, some pale, 5/2. 1 bag good clean scrap, 4/5. 1 case dark low quality scrap, bought in.
Palli	7 cases fine palish mixed biscuits, 5/7. 2 cases fine pale biscuits, 5/6.
Warriapolla	1 case well prepared choice pale biscuits, 5/8. 1 bag darker, 5/7½. 1 case similar, 5/7¾. 1 case little darker 5/7¾. 1 bag darker, 5/7. 1 case fine pressed scrap, 4/5.
Ballacadua	1 case good dark pressed crape, bought in. 1 case very dark ditto, bought in.
Wakaraka	1 case mixed palish and dark biscuits, bought in. 2 cases pressed scrap, 3/9.
Tallagalla	2 cases strong dark biscuits, 5/7. 2 cases good pressed scrap, 4/5½. 1 case ditto mixed gritty scrap, bought in. 1 case rejections, bought in.
Yattawatte	1 case fine small palish to darkish Ceara biscuits, bought in.
Glencorse	2 cases strong fine darkish biscuits, bought in. 1 case good quality pressed scrap, bought in.
Nikakotua	3 cases darkish pressed crape, 4/8½. 1 case little darker, 3/8.
Culloden	3 cases good quality mixed colour biscuits, 5/7¼. 3 cases darkish pressed crape, 4/10. 1 case ditto dark, 3/6. 1 case tightly pressed dark crape, 3/5.
Ellakande	1 case good darkish biscuits, 5/7¼. 2 cases good darkish to dark biscuits, 5/7.
Tudugalla	2 cases fine strong darkish biscuits, bought in. 1 case good clean pressed scrap, bought in. 1 case inferior darkish, bought in. 9 cases fine strong darkish biscuits, bought in. 4 cases good mixed scrap, 4/5½. 2 cases black rather heated crape, 3/3.
F B	1 case pressed scrap, bought in. 1 case ditto darkish, bought in. 1 case similar, 4/2. 1 case mixed scrap and rejections, 3/9. 1 case mixed rather gritty scrap 3/6. 2 cases dark rejections, bought in. 1 case mixed scrap, and rejections, bought in. 1 case mixed biscuits, uneven size and colour, 5/6¾. 1 bag mixed rejections, 3/11½.
Clontarf	2 cases fine palish to darkish biscuits, 5/7½. 2 cases darkish to dark crape, 4/2½.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Glanrhos	4 cases good darkish to dark biscuits, 5/7½.
Rangalla	1 case fine palish biscuits, bought in. 1 bag mixed rejections, 3/-.

STRAITS SETTLEMENTS.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Semba	2 cases fine pale crape, bought in. 6 cases pale to darkish, bought in. 2 cases ditto, bought in. 2 cases good dark and darkish crape, bought in. 2 cases ditto, bought in. 8 cases very fine well prepared amber crape, bought in. 1 case ditto little darker, bought in. 3 cases mixed darkish, bought in.
B M P L	3 cases good palish and darkish crape, 5/6. 15 cases mixed reddish crape, bought in.
L E Muar Straits	7 cases very choice well prepared strong pressed blocks, bought in. 3 cases choice well prepared light amber crape, bought in. 1 case dark crape, bought in. 1 case ditto, 4/8½.
SP	5 cases very strong darkish amber sheet, bought in. 1 case good sheet, bought in. 1 case ditto mixed colour and size, bought in. 1 case good mixed sheet and biscuits, bought in. 1 case darkish crape, not very strong, bought in. 1 case little darker, rather weak, bought in. 1 bag badly heated biscuits and sheet, bought in. 1 case mixed scrap, bought in.
F J R	3 cases darkish pressed scrap, bought in.
S P	1 bag pressed scrap, bought in.
B R R Co Ld.	3 cases fine palish to darkish scored sheet, bought in. 1 case pale to darkish scored sheet and crape, bought in. 1 case good darkish crape, bought in. 6 cases strong palish crape, bought in. 16 cases very choice well prepared pale amber crape, bought in. 1 case darkish crape, 4/4. 6 cases similar, 4/3. 1 case very dark heated crape, 2/6.
R R S S R	10 cases good strong palish sheet, 5/7¼.
S	9 cases mixed pressed scrap, 4/5. 3 cases darkish pressed scrap, 4/1. 2 cases mixed gritty pressed scrap. 3/2.
P R S B	5 cases good quality strong darkish sheet, 5/7¼. 4 cases very mixed scrap, 4/0½. 1 case mixed rejections, 3/8. 1 case mixed scrap and rejections, 3/9.
Gula	3 cases fine mixed amber sheet, 5/7¼. 1 case darkish, 4/0½. 1 case mixed pressed scrap and sheet, 3/10½.
S R & Co	14 cases good quality strong darkish scored sheet, bought in. 1 case good mixed lightish crape, 5/3. 4 cases darkish pressed crape, 4/10. 1 case little darker, 4/10. 3 cases good darkish pressed crape, 4/10. 1 case ditto dark, 3/7½. 5 cases good quality darkish scored sheet, bought in. 4 cases mixed palish and darkish pressed crape, 5/1¼. 3 cases good darkish pressed crape, 4/10. 1 case very dark ditto, slightly heated, 3/6. 7 cases darkish pressed crape, 4/10½. 2 cases very dark, bought in.
SSBR&CoLd.	10 cases well prepared choice strong sheet, bought in. 4 cases mixed pressed scrap, 4/5½.
Sungei Krudda	2 cases good darkish sheet, 5/7½. 3 cases fair quality pressed scrap, 4/5. 2 cases mixed darkish ditto, bought in.
Sungei Krudda S K S	3 cases good darkish sheet, 5/7½. 1 case mixed rather heated, scrap, 4/4.

Singapore.

Abstract of Meteorological Readings for the month of August, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	Ins.	°F	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory	29·902	143·1	80·7	88·3	73·4	14·9	77·2	·863	74·8	77	S. E.	5·60	1·94

A. B. LEICESTER,
Meteorological Observer.

T. C. MUGLISTON,
Acting Principal Civil Medical Officer, S. S.

Kandang Kerbau Hospital Observatory,
SINGAPORE, 21*st September*, 1906.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for August, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29·914	147·0	78·4	88·0	73·6	14·4	76·6	·858	75·4	81	N. W.	10·51	2·21

Colonial Surgeon's Office,
PENANG, *7th September*, 1906.

M. E. SCRIVEN,
Assistant Surgeon.

S. LUCY,
Acting Colonial Surgeon, Penang.

Malacca.

Abstract of Meteorological Readings for the month of August, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	%	%		Ins.	Ins.
Durian Daun Hospital ...	29·832	154·0	79·6	89·3	69·7	19·5	81·6	1·067	54·4	94	N.W.	18·47	5·30

COLONIAL SURGEON'S OFFICE,

MALACCA, 20*th September*, 1906.

F. B. CROUCHER,

Colonial Surgeon, Malacca.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of August, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·882	149·6	80·0	89·8	71·4	18·4	76·2	0·834	73·7	81	S.W.	7·05	1·65
Pudoh Gaol Hospital ,,	...	...	...	...	...	...	...	...	...	...	...	6·77	2·41
District Hospital ,,	...	...	...	...	...	...	...	...	...	...	...	8·99	1·90
,, Klang	...	...	...	88·0	69·5	18·5	...	...	...	...	...	7·22	2·75
,, Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	9·87	2·46
,, Kajang	...	...	...	89·6	71·3	18·3	...	...	...	...	...	12·55	3·27
,, Kuala Selangor	...	...	...	87·1	76·7	10·4	...	...	...	...	...	4·85	1·60
,, Kuala Kubu	...	...	...	...	...	...	...	...	...	...	...	10·45	2·03
,, Serendah	...	...	...	...	...	...	...	...	...	...	...	9·12	1·28
,, Rawang	...	...	...	...	...	...	...	...	...	...	...	12·38	3·23
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	8·41	1·86
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	...	5·27	0.96

STATE SURGEON'S OFFICE,
KUALA LUMPUR, 20*th September*, 1906.

E. A. O. TRAVERS,
State Surgeon, Selangor.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of August, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew point.	Humidity.			
Kuala Lipis ...	...	...	...	94·0	67·0	19·32	...	...	...	...	...	14·92	3·22
Raub ...	...	...	...	93·0	67·0	17·03	...	...	...	...	...	7·52	1·63
Bentong ...	...	...	...	93·0	68·5	19·16	...	...	...	...	...	7·87	1·97
Temerloh ...	...	...	...	94·0	71·0	18·29	...	...	...	...	...	3·20	·95
Pekan ...	...	...	...	90·0	70·0	14·90	..	...	...	...	...	3·92	1·35
Kuantan ...	...	...	...	93·0	66·0	18·67	...	..	...	...	...	9·54	2·00
Sungei Lembing ...	...	...	...	...	None	received	...	...	...	...	...	...	...

STATE SURGEON'S OFFICE,

RAUB, 19*th September*, 1906.

W. H. FRY,

State Surgeon, Pahang.

The Duff Development Company, Limited, Kelantan.

Abstract of Meteorological Readings for the month of August, 1906.

DISTRICT.	Temperature.			Rainfall.	
	Maximum.	Minimum.	Range.	Total Rainfall.	Greatest Rainfall during 24 hours.
	Mean. °F	Mean. °F	Mean. °F	Inches.	Inches.
Kuala Lebir ...	86·6	70·7	15·9	6·35	1·31
Sokor ...	89·1	71·0	17·4	7·96	2·40
Serasa ...	90·8	70·8	20·0	15·41	2·04

SURGEON'S OFFICE,
11*th September*, 1906.

WISTON BAKER,
Surgeon.

No. 11.] NOVEMBER, 1906. [Vol. V.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

EDITED BY
H. N. RIDLEY, M. A., F. L. S.,
Director of Botanic Gardens, S. S.
AND
J. B. CARRUTHERS, F. R. S. E., F. L. S.,
Director of Agriculture & Government Botanist, F. M. S.

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NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, etc. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valua-"tion regarding new or little known natural or manufactured pro-"ducts of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M.A., F.R.S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

AGRICULTURAL BULLETIN

OF THE

STRAITS

AND

FEDERATED MALAY STATES.

No. 11.] NOVEMBER, 1906. [VOL. V.

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According to Messrs. SMITHETT and DEVITT, two of the Judges at the Show "What clearly happened was that the Judges dipped their hands into the sample and picked out a piece of rubber which perhaps was not as good as the rest of a big sample but the whole sample was judged by the piece chosen." If this is correctly reported the Judges have a good deal yet to learn about judging anything at a Show. The best course is if *A* sends 5 lbs. and *B* 50

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However, it seems clear from the Judges' remarks that much of the rubber sent was younger than that of Ceylon, presumably from younger trees. This of course was the fault of the Exhibitors for as the Malay Peninsula planters started planting just at the same time as those of Ceylon, possibly a little earlier, there are plenty of trees as old in the Peninsula as any in plantations in Ceylon. Many do not appear to have shown the best they could turn out.

The Official list of prizes is published in the *Ceylon Weekly Times* from which we take the following notes:—Biscuits were but little exhibited by the Malay planters, only five Exhibitors against 47 Ceylon planters. Biscuits have, as a matter of fact, gone out of fashion here for some time, naturally the prizes fell to Ceylon planters. In Sheet rubber, the Peninsula showed in larger proportion, Kuala Kangsa Gardens got an extra silver medal and Kamuning an honourable mention. In Crepe Pataling got a silver medal. In the best sample of Worm-flake or block, Lanadron got the gold medal, Scrap was won by Vallambrosa, silver medal, and an honourable mention to Jebong. Rambong was entirely won by the Malay planters, Golden Hope a gold medal, Sungei Rengam a silver one, Highlands and Lowlands, honourable mention. The best Commercial Sample was won by Lanadron, whose superintendent won a gold medal and a silver bowl, as well as a special prize for the best sample of rubber from the Malay Peninsula.

The points selected by the Judges were generally speaking strength appearance, brightness of colour and smoothness of surface. The Malay rubber was said to be darker in colour than that of Ceylon. It may possibly be that this is due to climatic influence during drying. Young rubber was said to be much improved by being smoked and the attention of planters is called to this point again. It is rather interesting to note how after many trials the manufacture seems to be going back in many points to the earliest methods in use here. The old herring-bone tapping in use in the Botanic Gardens in 1890, is replacing spiral and other systems; Block rubber, the form in which Para-rubber was shown at all Horticultural Shows here for fifteen years is likely to replace crepe and sheet, Biscuit practically disappearing; and smoking rubber, always done in the early days of biscuits, is now probably to return.

H. N. R.

A DEVICE FOR TAKING AND RECORDING THE GIRTH OF PARA RUBBER TREES.

By P. J. Burgess.

The instrument consists of a stout stick three and a half feet long to which a leather strap is nailed at three feet from one end. The strap is long enough to encircle the largest tree to be measured, and is fixed to the stick transversely, so that when the stick is held vertically the strap is horizontal. The instrument is made as as follows:—A strip of leather two inches wide and three to four feet long is taken, and a drawing-pin or small nail fixed at one end with the point projecting through the leather. The strap is then nailed across a stout stick three and a half feet long, fixing the strap a distance of three feet from the end of the stick, and allowing three inches of that end of the strap which carries the drawing-pin to project across the stick. The face of the strap next the stick is covered with a strip of white paper, and the apparatus is ready for use.

To measure a tree stand the stick upright against the tree, girdle the trunk with the leather strap, and measure and at the same time, record, the girth by pricking a small hole in the paper. In this way the strip of paper becomes covered with a number of small pricked holes each of which represents the girth of a tree, taken at three feet from the ground, and the measure of which is the distance of the hole from the pin point when the strap is laid out flat.

Each tree as measured is chalk marked and at the end of the day the straps are "counted." This is done in this way: the strap is laid flat on a table and distances in inches ruled off, measuring from the pin point. The number of pricked holes in each section gives the number of trees of girth corresponding to that section, measured in the day.

The advantages of this method are that it is very rapid, it does not demand skilled labour in the field as there is no reading of tapes or writing to be done, and above all it gives the daily returns in a suitable form for calculating averages, and the number of trees of each inch or girth, which is valuable information. The disadvantage is that individual trees are not identified.

In working out the averages two corrections should be applied the first is the addition of half-an-inch to allow for the measurements being taken in even inches, thus 254 trees of girth 26 to 27 inches have the true average of 26·5 inches; the second correction allows for the thickness of the strap and errors in not straining the strap sufficiently tight in measuring. This error is corrected by subtracting half-an-inch from the average results. If therefore trees of say 26 to 27 inches as measured be called of average 26 inches the two errors will practically cut each other out. Except for very important work it is not necessary to consider these corrections.

CREOSOTING RUBBER.

In a lecture given by Dr. WILLIS at the close of the Rubber Exhibition in Ceylon he raises the question of creosoting rubber. He says "on the whole smoked rubber with creosote turned out better in quality than rubber unsmoked. He did not say plain smoking would have much to do with it but there was little doubt that creosote did strengthen the rubber. That raised the question whether they ought to make use of creosote. He thought that it might be found better to add creosote in the latex, and simply cure the biscuits in that form. Mr. PARKINSON who worked out the methods of making biscuits in 1898 used creosote and if they referred to a circular issued in that year they would find that he had calculated the amount of acetic acid and creosote to be used. They kept the biscuits and except some surface mould—they had kept their light colour for years together. He thought on the whole to add a little creosote to the milk and then coagulate it would perhaps make the rubber better to handle."

The experiment of creosoting latex was one of the earliest attempted here. The fresh latex was mixed with a little creosote and dried naturally in block, without the use of acetic acid. The idea was that the darkening of the colour of the rubber was due to bacterial or fungal action and the creosote would disinfect it and keep it light colored. With a very little creosote it was found that the rubber did remain a little lighter in colour. With more creosote it was not much improved and it went tacky and was spoiled. It seemed to have no useful action on the rubber, and except in very small quantities was injurious; whereupon this experiment was abandoned.

H. N. R.

DISEASES OF HEVEA BRASILIENSIS.

Leaf Diseases—The leaves of seedling *Hevea brasiliensis*, are extremely liable to injury by mechanical means or by fungi. These injuries are usually local, *i.e.*, they affect a small part of the leaf only and do not interfere with the functions of the remaining tissue. The appearance of a diseased leaf depends to a great extent upon the structure of the leaf itself, and in the present case practically all injuries cause a whitish semi-transparent area bordered by a brown line. Leaves of older plants appear to be immune to most of the fungi which attack seedlings. The commonest leaf fungus is that of Gray Blight, *Pestalozzia Guepini*, Desm., this is comparatively harmless on leaves, but kills the seedlings when it attacks the stem at the collar; the diseased patch usually takes the form of a white ring surrounding the stem, bordered by a narrow red brown line. Equally abundant, but of still less importance, are the leaf spots caused by *Helminthosporium heveæ*, n. sp.; these are small, circular, semi-transparent, and bordered by a purple-brown line. In one instance in which the first leaves of seedlings turned yellow and dropped off, two fungi, which have been named *Gloeosporium brunneum* and *Colletotrichum heveæ*, were found on the leaves. *Phyllosticta heveæ*, Zimm., and *Gloeosporium elasticæ*, CKE. & MASS., have also been observed.

Root Diseases.—The first specimens of root disease were forwarded to Peradeniya as examples of the damage caused by white ants. In old trees the fungus attacks the tap root; this is subsequently eaten by termites. The tree, however, continues to obtain a sufficient supply of water from the side roots until it is blown over by stronger winds than usual. As a rule, it is impossible to detect the fungus before the tree is uprooted. Saplings die before the mycelium reaches the surface. In the majority of cases the fungus appears to be identical with that reported from the Straits in 1904, *viz.*, *Fomes semitostus,* Berk. No fructifications have been found in the field, but several have been grown at Paradeniya on diseased stumps from affected areas. This species spreads underground along, the roots of grasses, etc. In one instance the fungus was Poria vincta, B. & Br., it seems impossible, however, to distinguish the two by mycelium alone.

A third root fungus which attacks Hevea is practically omnivorous, specimens having been sent in a cacao, dadap, tea, Castilloa, and Caravonica cotton. The mycelium only has been observed: this forms a yellow-brown or whitish felt on the root to which stones, etc., adhere firmly. It seems to be identical with the cacao root fungus prevalent in Samoa and attributed to *Hymenochoete,* sp.

It should be noted that all these root fungi are common on dead wood or stumps in the jungle and spread to cultivated products from stumps in cleaning.

Stem Diseases.—With regard to canker, the outlook is decidedly improved. Excision of diseased tissue has in all cases proved efficacious, without injuring the subsequent growth of the tree. At the beginning of the year, when I wished to become acquainted with this disease in the field, I had great difficulty in finding an affected tree. It must not be thought, however, that the periodic inspection of trees is now unnecessary, the disease may easily be kept in check if the first stages are noted, but neglect result in the death of the tree. I have seen a 12 years' old tree completely killed by it. The Government plantation near Badureliya was inspected in June after the jungle had been cleared away, and again in July when the trees were being tapped. Hardly any "canker" was found on either occasion. A few facts which may throw further light on the origin of the disease have been ascertained. The nectria on the dead bark has been named *Nectria diversispora.*

Megalonectria pseudotrichia (Schw), Speg., was observed in one instance on living branches of Hevea.

Fruit Diseases.—The blackening and decay of *Hevea* fruits which has been a constant feature during the last few years was exceptionally prevalent in June, and gave rise to the fear that there would be a shortage in the crop, but a dry July stopped the disease almost entirely, and the price of seed dropped in consequence from ₨. 30 to ₨. 2 per thousand. This disease is due to a *Phytophthora,* similar to that found on cacoa pods in other countries. On the rotten fruits grow *Sphoeronoema album,* n. sp., *Nectria diversispora,* n. sp., and *Diplodia zebrina,* n. sp. There is no doubt that this decay will always occur in wet seasons, and to minimize the possibility diseased fruits should be collected and burnt. It is not possible to form any opinion as to the success of the other preventive measures employed owing to the exceptional weather conditions of the last season.

A clear (*i.e.*, not sodden-looking) blackish discolouration, studded with minute black points, is caused by a fungus, *Asterina tenuissima,* n. sp., which also discolours the green stems. This is quite superficial and does no damage.

Miscellaneous.—A "die back" of Hevea saplings has been reported from one district. Two fungi have been found on the dead branches, but infection experiments with these have given negative result. *Vermicularia,* sp., has been observed on seedlings which have died from decay of the root; this would probably be prevented by a change of nurseries and sterilisation of the soil. It too often happens that owing to difficulties in the matter of water supply the same ground is used for nurseries every year without any special sreatment.

T. PETCH,

Peradeniya Annual Report for 1905.

THE WORK OF THE IMPERIAL INSTITUTE.

We have lately received a copy of the blue book containing the Report on the work of the Imperial Institute for 1905, which is a publication of no small importance to all who are in any way interested in the Agricultural and mineral wealth of the Empire. The Institute was placed under the management of the Board of Trade in 1902 assisted by an Advisory Committee including representative of this Department, the India and Colonial Offices, Board of Agriculture and Governments of India and the Colonies. The principal branches of activity of the Institute were the Scientific and Technical Department, the collection of Economic products and the Commercial Intelligence Department. The latter has been absorbed into the Board of Trade Intelligence Branch, located in the City of London, and the other two branches are carried on in the Imperial Institute building at South Kensington under the managership of Sir CECIL CLEMENTI SMITH formerly Governor of the Straits Settlements and Sir ALFRED BATEMAN.

Under the Directorate of Professor WYNDHAM DUNSTAN, aided by an energetic staff the progress of the extremely important work of the investigation of various Economic products of the Empire has made a truly remarkable progress.

Before the evolution of this Department it was not at all easy to get any new product examined and valued. Analyses could only be effected at a considerable cost, and there was no satisfactory method of bringing a new product, or an improvement of an old one to the notice of the trade, many valuable products remained wasting in different parts of the Empire, for want of a connection between the discoverer and the buyer, and for want of knowledge of their value and the best means of turning them to account. Many more riches lie at our feet waiting still till they can be put into the markets of the world. It seems remarkable in an Empire so rich in all manner of animal, vegetable and mineral products, that steps were not taken many years ago to found a bureau of information, with fully equipped laboratories to investigate the value of our property, but so it has been, and it is the work of the Imperial Institute to carry out these most valuable researches and to make the results known to all the world. Starting with very limited funds Professor DUNSTAN has developed in a few years a laboratory in which the most important researches have been carried out. A glance through the report shews everywhere the results already attained. Neglected minerals such as the Thorianite of Ceylon, overlooked vegetable produce such as fibres, oil-seeds, tan-stuffs, etc. have come into the notice of manufacturers and trades in them have opened. Planters have now an opportunity of having their produce valued, compared with other material, defects or merits pointed out, the causes of defects investigated, remedies suggested, and their commodities brought to the attention of the merchants in a way which was not possible before. That this has been appreciated is attested by the great increase in the work of the Institute in the past year. Nearly three times as many reports and letters were despatched as in the previous years, and this includes 222 detailed reports on special investigations of various products. The following list will give an idea of what has been done in the past year and is still being done:—

	Samples examined and reported on.	Samples being investigated.
Minerals ...	... 549	... 353
Foods and Fodders	... 45	... 60
Volatile oils	... 4	... 1
Tan stuffs	... 9	... 16
Dyes ...	... 4	... ...
Gums ...	... 1	... 3
Resins ...	... 8	... 3
Tobaccos ...	... 1	... 15
Fibres ...	... 166	... 96
Rubbers ...	... 35	.. 30
Drugs ...	... 30	... 46
Insect pests	... 16	... ...
Timbers ...	... 7	... 21
Oils and Oil seed	... 23	... 15
Animal products	... 23	... ...
	921	629

From the Malay Peninsula have been sent minerals, fibres, rubbers and essential oils and perfumes. Of the latter the Director reports they are of excellent quality and it is probable that this may prove to be an important industry.

Besides the work of investigation, the collections of Economic products have been improved and increased, the library re-arranged and kept up as well as funds would permit and has been constantly used not only by the staff for reference but also by numerous officers from the Colonies at home on leave who were pursuing further investigations on various products of their Colony.

The Bulletin of the Imperial Institute started in 1903, has often been quoted in this Journal. It includes for the past year fifty-eight reports and special articles of the greatest value. The Director and his staff have also published four Parliamentary papers, and a number of other articles of great scientific value in other publication and as independent works.

The whole report is in fact a very modest account of a vast amount of research, carried out at a very moderate expenditure. The funds of the establishment have never been very extensive and the cessation of the grant of £2,000 a year previously made by the Commissioners of the 1851 Exhibition which came to an end in the beginning of 1906, naturally caused some anxiety and made it necessary to trench to a considerable extent during the year on the accumulated balance of funds, to avoid a serious reduction in the efficiency of the epartment, and has also made it impossible to meet the legitimate demands for expansion. Negotiations are taking place to form a scheme for putting the Scientific and Technical Department on a satisfactory financial footing, and it is sincerely to be hoped that this may be effected. The establishment appeals to every agriculturist, miner, merchant and manufacturer in the Empire, and more especially to those in the Colonies. The nation has lately been strongly reproached for its neglect of Science and Scientific investigation, in the appreciation of the importance of which it is far behind other countries, instead of being as would naturally be expected in the forefront. It is quite time that this reproach should be taken away. The Imperial Institute has shown its capabilities in a most marked way. Its value to the Empire is now assured. It only remains for its financial position to be assured in such a way as to not only continue its work as in the past year but to expand its scope to the fullest extent.

H. N. R.

A DISEASE OF RUBBER SEEDLINGS.

A Correspondent in Borneo sends a letter containing an account of a vicious attack on his rubber seedlings which destroyed many. Specimens sent were too dry on arrival to make much of, but there was clearly a fungus attacking the base of the seedling and the lower part to bore elevated masses of wood of tissue and Epidermis, but no trace of fructification was to be seen.

He writes " I am sorry to say that the trial I made with the 2,100 seedlings you sent me proved a failure. The seedlings arrived here in good order and condition and every one of them was looking healthy, but though they were watered for the first day till I got sufficient rain only 40 per cent. survived of which many died afterwards. I may state that they were planted in the open without shade.

Rubber seeds I had received previously a large quantity of, which were planted out in nurseries. I made trials with covered and uncovered nurseries.

About 30 per cent. was found to have germinated in the Wardian cases from Ceylon and directly planted out in the nurseries. Till 2 days ago they did splendidly and reached the height of a foot. Coming on inspection to the nurseries this morning I found several young plants had turned yellow and upon taking them out I found that the roots just at the place where the plant was touching the surface soil were rotten.

I think it must be a disease which I used to have sometimes in the nurseries for tobacco and I shall try to kill the disease by watering the beds with Bouillé Bordelaise.

The reason cannot be that the nurseries were not sufficiently drained. The ground was hoed a long time ago and the nurseries are a foot and a half high. The soil is very porous and consists of 50 per cent. at least of sand. I planted seeds in bamboos and small gunny-bags and everywhere I got this disease".

The soil of these nurseries must be thoroughly infected with this pestilential fungus, and in cases like this it should be disinfected as far as possible with Copper Sulphate and Lime, and allowed to fallow, nothing being planted on it. Some years ago a very nice looking grassy plot in the Botanic Gardens was dug for beds, and cuttings of *Ficus elastica* and other plants put in, and also a plant of *Melocanna bambusoides* an Indian bamboo, all of which died. The cuttings were found to have a pink nectria-like fungus on the cut ends, the cambium layer died, and the plants never survived. Here again the ground was infected by a fungus and could not be utilized at all.

Has any one met with the fungus referred to by our correspondent? I know of nothing exactly like it.

H. N. R.

ATTACUS ATLAS AND RUBBER.

There is no more voracious and destructive Caterpillar than that of the Atlas moth *Attacus Atlas.* Its ordinary food is the leaves of the Sweet-sop and Sour-sop, *Anona reticulata* and *A. muricata*, but it will also eat all manner of other leaves and is the only caterpillar I have seen attacking the astringent Gambir leaves. It eats as might be expected from its large size a great deal of a tree, and reduces its foliage to rags in a very short time. Dr. LIM BOON KENG informs me that he found many of these caterpillars on his Sour-sop trees at Yo Chu Keng, where he has his rubber estate, and fearing that they might attack the Para rubber collected a number to experiment with. He says that on giving these animals rubber leaves to eat, they attacked them and ate for a few minutes then stopped and remained quite motionless till the evening when they fell from the twigs dead. The Hevea leaves had evidently a poisonous effect on these caterpillars. This is very satisfactory as we can have nothing to fear from this pest, which might if it could digest the leaves have proved a serious pest.

H. N. R.

PARA RUBBER ON THE GOLD COAST.

Mr. JOHNSON publishes his annual report for 1905, in which he gives some account of the progress of Rubber-culture, in the Gold Coast. Para rubber seems there to be more satisfactory than even the local rubber trees, for he says that attempts to extract rubber from Ofruntum (*Funtumia elastica*), Ceara and Assam rubber trees were again unsatisfactory. A large tree of the local *Ficus Vogelii,* yielded 1½ lbs. dry rubber of inferior quality. No returns are given of tapping Para rubber, but the growth appears to be excellent. Thus the diameter of :—

3	years old trees is	6·5	at 3 feet from the ground.
4	do.	10·	do.
5	do.	12·	do.
6	do.	16·	do.
10	do.	27·	do.
12	do.	40·	do.

Of seed, 168,000 seeds were distributed and 13,000 seedlings are ready for distribution in the rains. They will be sold at eighteen pence a dozen which is certainly cheap enough.

H. N. R.

EXHAUSTION OF WILD RUBBER.

IN AFRICA.

Every year the consular reports show how more and more the African rubber supply is diminishing and those for 1905 continue the tale.

The report for Angola says some ten years ago rubber grew exuberantly in many districts of Angola and merchants derived a profitable trade from its export which reached some 3,000 tons per annum. The wholesale devastation of the rubber forests which has extended over a lengthy period is now being perceptibly felt by the dealers who are beginning to realize that their sources of supply are rapidly becoming exhausted. The gathering of the rubber is left in the hands of the natives of the hinterland who are injuring all the trees by ruthlessly cutting them down and over-milking. No attempt at systematic planting has been made except on the initiative of individual planters. The output is consequently steadily declining and will soon become insignificant unless measures are speedily taken to check the flagrant spoliation of otherwise fertile districts by adopting scientific methods of culture. "The principal rubber regions of Ambuellas and Luchases lie between the rivers Longa and Quando where seeds and living plants are being collected for the creation of an experimental Station of Fort Princeza Amelia, Cubango." In the Consular report for Gambia we read too "The decrease in rubber must I am afraid be a continuing one as there is now scarcely any rubber in the Colony and most of thas which passes through the Gambia comes from French territory" The returns of the export of rubber from this region are given at

1904—30,934 lbs. value £2,446
1905— 9,071 lbs „ £ 915.

IN INDO-CHINA.

"Indo-China produced for export 367½ tons of rubber valued at £97,150; £1,245 worth was also bought in from neighbouring countries and re-exported." Most of this rubber is the product of a wild creeping plant and is collected in the forests of Tonkin and Laos by Natives. The supply of it has suffered from the reckless and wasteful manner in which the harvest was made when the inhabitants first found that they were able to get a good price for it. Steps are now being taken to prevent this waste and to instruct the Natives in the proper method of collecting the rubber.

H. N. R.

NOTES ON THE ACTION OF COPPER SULPHATE ON AQUATIC PLANTS.

The following notes on the submerged plants of our ponds and ditches are though incomplete perhaps worthy of record. The experiments on the action of sulphate of copper on these plants would have been continued but for lack of time to do so.

What may be termed natúral ponds or lakes, such as one finds in most parts of the world, are very uncommon in the Malay Peninsula, and artificial ponds usually unless very deep become silted up very soon owing to the great denudation of the surrounding soil.

Consequently the number of indigenous aquatic flowering plants in the Peninsula is not large. The chief bearing of importance of these plants lies in their being apt to interfere with the water supply, and it was for this reason that the investigations and observations on these plants were made. Though the number of species is not great the extreme rapidity with which they grow when a lake or ditch is neglected makes them apt to be extremely troublesome and expensive to get rid of.

It is well known that to the cryptogamous aquatic flora, the Alga the action of copper sulphate is very deadly, and attempts were made to destroy these plants by the use of copper sulphate in sufficiently small quantities to be not deleterious to persons drinking the water.

The aquatic plants which occur in the Peninsula may be divided into those with floating leaves or which entirely float and those which are completely submerged. Those which float include the water lilies, *Nymphea stellata* and *Barclaya motleyi,* an inhabitant only of forest streams, *Limnanthemum cristatum*, the *Cryptocorynes,* which mostly inhabit the same kind of locality as the *Barclaya*, *Pistia stratiotes,* commonly cultivated by the Chinese to feed pigs, the duck-weeds *Lemna paucicostata, tenera* and *polyrhiza* and *Wolfia arrhiza,* and *Azolla.*

These plants do not in any way appear to be injurious to drinking water.

The submerged plants however are distinctly objectionable. The commonest of those are the *Utricularias, U. exoleta* and *U. stellaris, (Lentibulariæ) Enhydrias angustipetala* and *Blyxa malaccensis (Hydrocharideæ) Naias minor (Naiadaceæ)* two or more species of *Chara,* and a very large number of Alga, minute cellular cryptogams which grow in great numbers on the stems and leaves of the higher plants and in shallow places in the ponds and streams.

Enhydrias, Naias, the *Utricularias* and *Charas,* are readily propagated not only by their seeds, but also by small broken off pieces of stem and grow with immense rapidity soon filling up a pond or tank. They grow more or less free from the bottom of the tank and chiefly in the shallower parts. *Blyxa,* a plant with a tuft of grassy leaves grows on the bottom in shallow water and is propagated by seeds or stolons Ponds soon get full of these plants, the seed or small pieces of the stems being brought apparently on the feet of wading birds, such as snippets or carried by streams or rushes of rain, floods, etc.

Tons of these weeds are removed annually from the Garden's Lakes where they seem to have so thoroughly established themselves that eradication is impossible. So rapidly do they grow that it is necessary to clean them out of the lakes in cartloads two or three times a year.

It is in the shallower parts of the ponds where the depth is not more than three or four feet that these plants grow most thickly, and this was found to be the case also in the Impounding Reservoir, where all these plants occur, but fortunately not to so great an extent as in the Garden's Lakes. They seem unable to grow in deep water.

To clear these plants out, use is made of a long stretch of wire netting fixed to two vertical sticks which is drawn or pushed through the water like a seine net and draws the weeds to the side. Those that grow on the bottom have to be pulled up by hand when they float and are dragged in by the net. The coolies who do this work complain of irritation to the skin caused by handling these plants in this manner and cannot be kept at the work all day on account of this.

On these water weeds grow a large number of minute Alga of all fresh water groups and the decomposition of these minute plants seems to have a great tendency to foul the water, and to give it an unpleasant smell and taste.

The Utricularias by the aid of their small insect catching bladders destroy to a certain extent the rotifers, small Fly larvæ and other aquatic animals and may be of some use in ridding the water of some of these animals but infusoria and animals of other orders abound to such an extent among the branches of the *Utricularia,* that the proportion the plant actually consumes must be very small compared to the number that escape. Many Algæ grow abundantly on the Utricularias so as to form an objectionable mass when death of the plants set in, which rather negatives any use they may be of in cleaning the water.

The Algæ of the Malay Peninsula have not as yet been studied. Those of Java have been listed, described and figured in the *Algues de Fiore de Buitenzorg* by E. WILDEMAN but I have seen many which I could not identify with any described in that work even generically.

Among the Algæ which seem to be specially objectionable in fouling water to a large extent is one which appears to be *Crenothrix Kuhniana*, or a closely allied species. It consists of very fine filaments of no great length and of a rusty orange colour. It is extremely abundant in places where the water runs slowly or is stagnant and in shallow water especially where it passes over ferruginous gravel forms large flocculent masses of an orange colour. In rapidly moving water it does not seem to occur, at least abundantly except that in rivulets where the water is moving very rapidly it frequently forms a coating on the ground or on the sides of the stream where the flow of water moves most slowly. It does not apparently occur in the deeper parts of ponds or rivers. It grows however with other Algæ on the branches and stems of Chara, Utricularia, etc. and is easily detected by its orange colour. After a time it produces immense abundance of cocci which move briskly about in the water, but eventually by dividing pass into the zooglea stage. These cocci are rounded and aggregate into irregular masses joined together by a gelatinous matter. These masses of zooglea float on the surface of the water or encrust leaves, etc. beneath the water, unlike the rod-like from which sinks in water. They are apt to putrify and exhale a most unpleasant odour. In the swampy spots in the forests this Alga is extremely abundant, coloring the rotten leaves of a bright orange or duller orange-red, and in these spots we find a fauna of animals adaptively colored to render themselves inconspicuous. Among these are the red tortoise, *Geomyda spinosa,* the large red frog, *Rana macrodon,* and the small red Python, *Python curtus.*

From these shallow breeding grounds the Alga is carried by streams to ponds and lakes. At the Impounding Reservoir, I found after a windy day small masses of orange coloured froth blown up on the shore. This examined by the microscope showed that its orange colour was due to immense numbers of cocci, free and agglutinated. The water of one of the stand-pipes in Tanglin was observed to be tinted with yellow. I was unable to detect this Alga however being in very small quantity till I treated the water with copper-sulphate. A few days after a precipitate of an orange colour was found at the base of the jar, which on examination proved to consist of the cocci of this plant.

This Alga is extremely abundant in the Botanic Gardens. At the head of the lake there is an inflow of water from beneath the road, apparently from the lake at Tyersall. This water is quite clear, but where it runs to the lake, over some gravel and yellow clay, there is always a great quantity of this Alga. The streamlet after running along a channel cut for it in stiff clay enters a culvert and passes into the lake. The Alga is abundant on the dead leaves fallen into the channel and on the clay sides and bottom of the channel. In the lake where from silting the water is shallow with very little movement the Alga is extremely abundant covering the surface with a dirty orange unpleasant looking coat. In the deeper parts of the lake, there is none visible with the naked eye but it can be found on the *Utricularia* and other weeds which are abundant. It is also abundant where there are many fine roots of bamboos or other plants in shallow water, and seems very general in shallow water spots in ferruginous soil especially under shade. A bathing well at the foot of some bamboos contained a quantity of this Alga chiefly on the fine roots of the bamboos projecting into the well, and the natives who used it complained that the water produced an itching effect on the skin, and gave up using the well, which was then filled up and abandoned. Attempts were made to destroy this Alga in the lake where it was very bad by a solution of copper sulphate. A strong solution was made and thrown upon the floating Alga by a squirt and also from a bucket. The Alga disappeared at once wherever the copper sulphate touched it having apparently sunk, but its place was filled again shortly afterwards and the spot was soon covered again with it.

I collected a quantity of the water deeply coloured with this Alga from the inflow of the stream above the lake, and divided it into two lots in glass-stoppered jars containing about 3 pints (60 oz.) of liquid. The water was orange coloured and opaque or nearly so. To one jar I added $\frac{1}{32}$ oz. of powdered copper sulphate. In a few hours all the Alga had sunk to the bottom in a flocculent mass about an inch thick, the water above being quite clear. The Alga seemed to be dead but showed no definite signs of decomposition. The clear liquid above shewed no Algal or animal life. The untreated jar remained as before, the liquid being opaque and dirty orange coloured. But in a few days most of the Alga sunk to the bottom in this jar also, though the water was not as clear and transparent as in the jar treated with copper sulphate.

The orange colour of this plant is due to hydrated oxide of iron deposited in the gelatinous sheaths of the filaments and the zoogloea, and there can be little doubt that it plays an important part in the precipitation of iron oxide in clay and on gravel, etc. so as to form the rock commonly known here as laterite, if indeed it is not the origin of the whole of this rock. In clay it seems to grow on exposed surfaces and in cracks, through which a small quantity of water runs or settles, and I have detected this organism in red lumps of clay in a cutting, in abundance in the stage of cocci dividing. In clay cuttings in the Malay Peninsula I have seen roots growing through the soil, and exposed, being cut across by the formation of a road over which water was running slowly, and trickling down the bank. Where this occurred the roots were coated with one of these orange coloured Algæ and iron was being deposited. I have also met with cylindric casts of roots, in haematite. One of these casts is ½ an inch in diameter and perforated by a tube one-tenth of an inch across evidently corresponding to a root since decayed.

A similar case of the formation of iron-pan by an Alga (*Gaillonella*) is mentioned by LYELL in his Geology, and it is possible that all these oxide of iron deposits are caused by Algæ, or Bacteria.

I have called this plant an Alga and some Botanists consider it so, but DE BARY and others class it as an Arthrosporous Bacterium. The figure he gives of *Crenothrix Kuhniana,* (Morphology and Biology of Fungi, p. 470 fig 196) considerably resembles this plant, but appears to be bigger and it is difficult to see the characteristic breaking up of the filaments figured by him in the Singapore plant. The cocci and zoogloea forms are however quite similar. He mentions it as a Schizomycete which occurs frequently in water containing some amount of organic substances and sometimes in quantities which are dangerous to health, and indeed it seems to be a most objectionable plant in water.

Crenothrix is not the only Alga which gives an orange coloring to the water here, as on the *Enhydrias* and on *Utricularia,* I found an abundance of fusiform Diatoms of a reddish yellow colour, which were arranged in strings one over-lapping another, which gave an orange colour to the leaves of the weeds. It appeared to be a species of *Pleurosigma.*

It has been said that ponds have been completely cleared of Algal scum in Ceylon and elsewhere by the use of copper sulphate in such small quantities that animal life is not injured and the water remains purified and fit for human use. This apparently is not efficacious here. The quantity of copper sulphate required to precipitate the *Crenothrix,* is too great to be safe to use, and in ponds with shallow shaded edges the plant grows so rapidly that in a few days it is as bad as before. It can also apparently thrive under ground in water following the courses of roots so that it can be conveyed through springs, growing along the roots.

Action of Copper sulphate on other aquatic plants—A quantity of *Utricularia stellata* growing in the Garden's Lake was taken and put into two jars filled with water as in the case of the *Crenothrix.* One jar was treated with copper sulphate $\frac{1}{32}$ oz. to the jar. The other untreated. The *Utricularia* was swarming with rotifers, paramœcia, minute larvæ and other animals, besides containing numerous diatoms, desmids, and other Algæ of different kinds. The day after the copper sulphate was added, a good deal of the Utricularia was found to be dead and there were no signs of animal life except at first a few *Paramœcia.* Dead insect larvæ were seen at the bottom of the jar. In the untreated jar the rotifers, vorticellas and other infusoria were lively and thriving and the Utricularia was green and healthy.

A remarkable thing noticed about this *Utricularia* was that the older bladders, apparently those that had caught infusoria, were of a rich and brilliant deep blue colour. In the earlier stages they were at first pale pink then became pale blue, darkening till they appeared black, though showing deep blue under the microscope. This coloring occurs not only in the cells of the bladder but also in those of the valve. The Utricularia grows with great rapidity in the lake, and is a nuisance choking it up, but I do not think it is on the whole a very objectionable plant, or that it seriously injures water for human consumption unless it by any accident dies and putrifies in large quantities.

Chara sp.—Similar experiments were tried on a species of Chara found growing abundantly in a ditch along the roadside at the edge of the Botanic Gardens. It was thickly covered with red sand brought down by the stream and Algæ were also growing abundantly on it, especially noticeable being a deep green Alga (apparently one of the *Cyanophyceæ*) growing in tufts. A quantity was collected and put into two jars with abundance of water. The water became very cloudy. In one jar a pinch of copper sulphate was put. By next day all the animal life seemed to be dead as were the Algæ. The Chara was apparently dying. The outer walls of the branches had shrunk and the cell contents, chlorophyll granules, etc. had shrunk into the middle.

The proportion of copper sulphate given in this case was really larger than in the case of the Utricularia which perhaps accounted for the more rapid effect.

It is clear that copper sulphate has a strong effect on all these plants and is also fatal to animal life in the water, but it is required to be used in quantities too large to allow the water to be safely used for human consumption afterwards.

H. N. R.

CORRESPONDENCE.

ANTS ATTACKING RUBBER SEEDLINGS.

Sapong Estate,
Fort Birch,
N. B. Borneo.
21st October, 1906.

Dear Mr. Ridley,—May I ask your kind advice as to how best to treat a new pest which is attacking our Para seed: this ant is best known to Malays by its name of Semut Gatal because its bite produces the same swelling as does that of a mosquito, it is however called by others Semut Krikit and Semut Gula.

I have often seen it in houses where it frequently eats through the corks of bottles containing oil. It also gets into hams, or eats into biscuits or other sweet things.

In many cases as soon as we have sown out a bed of Para seed this ant covers each seed the same night with earth and then proceeds to scoop out all the nutty interior of the seed and take it away to their nest. It does not always proceed in this manner but more frequently approaches the seed from below under the soil and this is the most dangerous manner as it cannot be seen. These ants attack the seed at all stages from the time it is put in the ground until the shoot becomes green after which they seem to take no more interest in it, they attack the shoot so long as it remains white. I am sending you under separate cover samples of all three sexes of these ants which died after feeding on corrosive sublimate. The very large one does the boring, I have watched him (her or it) at it.

They do not seem to mind Pyrethrum in the least, nor one per mil. corrosive sublimate but leave after repeated Kerosine emulsion spraying. This latter is expensive and does not prevent them from attacking from below.

They occasionally give trouble in tobacco seed beds by taking away the seed and completely devastated my seed beds of chillies this year.

I have tried soaking the Para seed in one per mil. corrosive sublimate and then drying and so far they have not attacked these. I have also dipped some seed in tar and then rolled them in lime and these are also not attacked but both these involve some considerable time and expense when dealing with half a million seeds nor am I sure that the seeds subjected to the tar and lime treatment will germinate: in either case nothing protects the shoot as soon as it comes out.

Will you allow me to make two suggestions as to your Agricultural Bulletin which is of the greatest help and use to us? I would first of all suggest that you should start a column of questions and answers, there are many of us who have neither the time nor the power to write articles on the subjects which interest us but we can put many intelligent questions which might help to the solution of difficulties: I would suggest that you print the name of the writer, his question, and then your answer or an invitation to some one else to give his experience if necessary. I would lay especial stress on printing the question as otherwise your readers would not get the full benefit of the answer.

I would also beg to suggest a series of illustrated articles on labour saving devices and agricultural implements of England, the United States, and the Continent: there are many cute implements about which we know nothing out here and I personally have experienced the greatest difficulty in getting such things.

Awaiting with interest your advices in these matters.

I have, etc.

FRANK E. LEASE.

The ants sent by Mr. LEASE are a very abundant and familiar kind which is frequently to be found in houses. The large one referred to seems to be an adult worker, the others young workers.

Ants have frequently been accused of attacking rubber seed in the bed and one has often found the seed testa cleaned out by them. I have always considered this however, to be due to the seed having been injured or killed just after germination by some accident and then attacked by ants. Cracked seeds are often thus destroyed. I have never previously come across seedlings being attacked by ants, nor indeed do I know of any ant here which naturally eats growing and living plants though there are many which do so in other parts of the world.

There are however many seed eaters here, which carry off small seeds such as grass seeds, or rice to their burrows and devour it. To protect small seeds against these pests, the seed (such as that of *Ficus elastica*) is sown in boxes supported over water so that the ants cannot get at them. This would be impracticable of course in raising large quantities of Para rubber seed.

An ant quite similar to the one sent by Mr. LEASE was at one time a nuisance in my house. I succeeded in evicting it in the following way: Its nest was beneath the boards in one of the rooms so I mixed some white arsenic with white sugar and made a little pile near the entrance to the nest. In a surprisingly short time all the sugar and arsenic was carried by the ants into the nest. Not a grain was left, and not an ant survived the meal. I served several nests in this way. It is of course easy to find out where the nests are, by strewing a little sugar or some such bait and watching where the ants carry it to. Of course, care must be taken to prevent domestic animals from getting at the arsenic, and so much must not be thrown about as to poison the soil. A salt spoonful of the mixture will do for most nests, if piled up near the entrance.

In ground infested by these pests I would suggest breaking up the nurseries in plots surrounded by ditches full of water. The nurseries should be put in low lying wet ground when it might be possible to flood them whenever the ants become troublesome. Flooding a seed bed for a few hours does not hurt the seeds, or if not too deep the seedlings but it is fatal to ants and they soon quit a flooded spot. There are a good many safe insecticides known also with which the beds might be watered. Most are strong preparations of Nicotine. Clubicide is as good an insecticide as can be got and is quite harmless to plants. These liquid insecticides however are apt to be washed away by heavy rains, and a bed might require to be treated several times.

With respect to Mr. LEASE'S two suggestions at the end of his letter we would point out that correspondence and queries are invited. In the earlier days of the Bulletin we did receive both kinds of correspondence and had what might be called a notes and queries column but this has fallen off, and as all correspondence and queries (other than enquiries as to the rudiments of coffee planting and such like queries) are published, readers will judge for themselves what amount of such correspondence the editor receives.

As to the publishing more figures and descriptions of the latest things in machinery more perhaps might be done. The difficulties of getting pictures printed in the Straits is not as great as in former years, but it is apt to be rather long in being done and there are no means of doing really good work here yet. It is certain however that tropical agriculture is very much behind hand in use of machinery, and it is quite time that we should elaborate our cultivation in this direction.

H. N. R.

THE ALLIGATOR APPLE.

BOTANIC STATION,
BELIZE, BRITISH HONDURAS,
August 15*th,* 1906.

MY DEAR SIR,—In your Agricultural Bulletin for December, 1905, I notice a short note on the Alligator Apple (Anona palustris) stating that this fruit is scarcely eaten, etc.

Contrary to this, in this place where the Alligator Apple grows plentifully on the low swampy ground around Belize town, the ripe Alligator Apple is greedily eaten by the natives—men, women and children—without any evil consequences whatever. The ripe fruit has a sweet tempting smell which generally attracts a hunt for every fruit possible.

Yours faithfully,
E. G. F. CAMPBELL.

AGRICULTURAL SHOWS IN BRITISH AFRICA.

LIVERPOOL UNIVERSITY.
INSTITUTE OF COMMERCIAL RESEARCH IN THE TROPICS,
PUBLIC MUSEUMS,
Liverpool, 20th September, 1906.

DEAR SIR,—I have the honour to inform you that we are endeavouring to form an exhibit to send out to the Agricultural Shows which are to be held on the Gold Coast and in Lagos, West Coast of Africa, early in November. Such exhibit will afterwards be permanently housed in an Agricultural Institute now being formed at Abeokuta.

The object of sending out this exhibit is twofold; first, educational, to instruct the natives in the best methods of growing their crops and preparing their produce; and secondly, commercial, to give an impetus to British manufacturers, and to the West African trade.

The exhibit may be divided into two parts, first, apparatus and appliances, and second, economic products.

Under the second heading it is proposed to send out examples of tropical produce prepared in the very best manner, the exhibits to form a series showing each product in every stage of its preparation. Thus, to take the case of cocoa. The exhibit would consist of beans of the very best varieties, in the pod, newly taken from the pod; fully fermented; fermented and washed; and fermented, washed and coloured; with notes explaining the different processes and diagrams and photographs representing the cultivation.

In the same way it is hoped to show the various steps in the gathering and preparation of Para rubber in Ceylon, of cotton in the West Indies, of tobacco at Key West, and so on.

I should be glad to know whether you would be willing to assist us in preparing these exhibits by the loan or gift of produce.

Exhibits of produce should be accompanied by full notes as to each stage of preparation.

Messrs. ELDER, DEMPSTER & Co. have agreed to carry the whole of the exhibits sent out under the auspices of this Institute free of charge by the steamers of either the African Steamship Co. or the British and African Steam Navigation Co.

I have, etc.,

MOUNTMORRES,

Director.

GOW, WILSON & STANTON, LIMITED.

India Rubber Market Report.

13, ROOD LANE, LONDON, E. C.

September 28th, 1906.

At to-day's auction, 334 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which about 259 were sold. The total weight amounted to over 20 tons, Ceylon contributing about 2¼ and Straits Settlements nearly 18.

The market was fairly steady for all descriptions and good general competition characterised the auction, though in many cases the prices offered for the finest grades (principally crepe) did not come up to sellers' ideas.

A parcel consisting of 20 cases of very fine pressed blocks from the Lanadron Estate (Johore) realized the top price in the auction, *viz.*, 5/10 per lb.

The best sheet and biscuits sold at from 5/6 to 5/7¼, and Crepe can also be quoted at the same figure. There was a strong demand for the darkish Crepe running up to about 4/10 to 4/11.

In Ceylons, one or two cases of fine biscuits realized 5/7 per lb.

QUOTATIONS.—Fine Sheet, 5/7¼.
Fine biscuits, 5/7¼.
Good biscuits, 5/6.
Crepe { Fine pale, 5/7¼.
Palish to darkish, 4/6 to 4/10.
Dark, 3/9 to 4/4.
Scrap { Fine, 4/6.
Fair to medium, 3/9 to 4/-.
Low, 2/6.

PLANTATION FINE TO-DAY.—5/6 to 5/7, same period last year, 6/2 to 6/3.

PLANTATION SCRAP.—3/- to 4/6, same period last year, 3/10 to 5/4.

FINE HARD PARA (South American).—5/1½, same period last year, 5/6.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

259 packages at 5/5¼ per lb., against 163 packages at 4/9 per lb. at last auction. Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
F B	1 case scrap and rejections, 4/-, 1 case dark scrap, 4/-, 2 cases ditto, 4/1½, 1 case scrap and rejections, bought in.
Rangalla	1 case darkish biscuits, bought in.
Warriagalla	1 case good pale amber to darkish biscuits 5/6, 1 bag ditto dark, 5/4.
Ballacadua	3 cases fine pale and palish biscuits, 5/7.
Waharaka	1 case good darkish biscuits, 5/7, 2 cases darkish scrap, 3/9.
Palli	1 case pale and palish cut biscuits, 5/5½, 1 case heated scrap and lump rejections, 4/-.
Ingoya	5 cases fine pale to darkish biscuits, 5/7, 2 cases good palish to darkish pressed scrap, 4/6¼.
Langsland	5 cases fine palish to darkish biscuits, 5/7. 4 cases good darkish to dark biscuits, 5/6¾.
S	1 case good palish biscuits, bought in. 1 case little darker bought in 1 case palish to darkish biscuits, bought in. 1 case palish to darker heated biscuits, bought in. 1 bag scrap, bought in.
Sarnia	1 case palish to darkish rejected biscuits, bought in.
Culloden	6 cases fine pale to darkish biscuits, 5/7. 5 cases good palish pressed crepe, 5/1¼. 2 cases ditto, very dark, 4/9¼.
Ellakande	2 cases good palish to darkish biscuits, 5/7.
Nikakotua	3 cases good palish to darkish sheet, 5/7.

STRAITS SETTLEMENTS

Mark.	QUANTITY DESCRIPTION AND PRICE PER LB.
B R R Co Ld.	29 cases fine pale to palish crepe, bought in. 2 cases palish to darkish crepe, bought in. 9 cases darkish crepe, 4/9¾. 3 cases ditto, darker and inferior, 4/8. 4 cases very fine pale to palish amber crepe, bought in. 2 cases good darkish crepe, bought in.

Sungei Krudda	7 cases good palish to darkish sheet, bought in. 8 cases good palish to darkish scrap, 4/4½. 3 cases inferior scrap, bought in.
S K B	3 cases good palish to darkish sheet, bought in.
S K S	1 case rejections, bought in. 1 case good palish scrap, 4/4.
A G N	1 case palish biscuits, bought in. 1 bag rejected biscuits, bought in. 1 bag scrap and rejections from biscuits, bought in.
Kananbyle	1 case inferior biscuits, bought in. 1 case scrap and rejections, bought in.
Sungei Krudda	2 cases dark scrap, bought in. 6 cases rejections, bought in.
Highland Est.	11 cases good darkish scored sheet, 5/7. 3 cases palish to darkish crepe, 5/4. 3 cases darkish crepe, 4/10½. 5 cases darkish to black crepe, 4/10.
R M P LTD	5 cases good palish to darkish crepe, 5/5. 19 cases darkish to dark crepe, 4/10½.
B M & C D	3 cases good palish to darkish sheet, 5/6. 1 case scrap and heated biscuits, 2/9½.
B M & C C	1 case rejections, 3/6. 1 bag ditto, 3/6. 1 case darkish pressed scrap, 3/3.
L E Muar Straits	20 cases very fine strong pressed blocks, 5/10. 1 case good darkish crepe, 5/-. 1 case ditto darker, 4/10.
S P	5 cases good palish to darkish scored sheet, 5/7. 1 case ditto paler, 5/7. 1 case ditto palish to darkish, 5/6. 1 case ditto darker, 5/6. 1 case darkish crepe, 4/11½. 1 case ditto darker, 4/10.
F J R	3 cases pressed scrap, bought in.
S P F C	1 bag palish to darkish pressed scrap, 4/0½.
A	2 cases palish to dark biscuits, 5/6.
S R Co	18 cases good darkish scored sheet, 5/6¾ to 5/7. 2 cases good palish pressed crepe, 5/7. 4 cases darker, 5/4¼. 1 case thick darkish, pressed crepe, 4/8½.
V R C O Klang F M S o o o	24 cases fine palish to darkish small scored sheet, 5/6¾. 17 cases little darker, 5/6¼. 3 cases thick palish pressed crepe, 5/4¾. 12 cases darker, 4/10. 1 case black, 4/4½.
K	1 case inferior pressed scrap, 3/5½.
P S E	5 cases fine palish sheet, 5/7.
S	10 cases good small palish to darkish sheet, 5/6¾.

R R Jebong	16 cases fine large palish to darkish sheet, 5/7.
SBRC Ld	7 cases fine large palish to darkish sheet, 5/7¼.

Lewis and Peat's Ceylon, Straits and Malay States Plantation Rubber Report.

28th September, 1906.

At auctions the following lots, comprising about 3¾ tons Ceylon and about 16½ tons Straits and Malay States, were offered and sold as follows:—

Ceylon.

						per lb.
Warriagalla	1	case	pale Ceara biscuits	...	@	5/6
Ballacadua	3	,,	Biscuits mostly thin pale little mouldy	...	,,	5/7
Waharaka	1	,,	Biscuits dark dull	...	,,	5/7
	2	,,	Scrap common barky	...	,,	3/9
Palli	1	,,	Ceara biscuits, very rough, part heated	...	,,	5/5½
	1	,,	Fair scrap some sticky	...	,,	4/-
Ingoya	5	,,	Fine pale amber sheets	...	,,	5/7
	2	,,	Pressed scrap part good part heated	...	,,	4/6¼
Langsland	5	,,	Good pale amber biscuits	...	,,	5/7
	4	,,	Darkish	...	,,	5/6¾
S	4	,,	Pale Ceara biscuits mixed	...	,,	bought in
Sarnia	1	,,	Small darkis biscuits	...	,,	5/7
Culloden	6	,,	Fine pale biscuits	...	,,	5/7
	5	,,	Brown Crêpe	...	,,	5/1¼
	2	,,	Chip do.	...	,,	4/9¼
Ellakande	2	,,	Good amber biscuits little mouldy	...	,,	5/7
Nikakotua	3	,,	Slightly mouldy sheets	...	,,	5/7
Sungei Krudda	7	,,	Good darkish amber sheets rather rough		,,	bought in
	8	,,	Fair brown scrap	...	,,	4/4½
S K B	3	,,	Dark amber sheets	...	,,	bought in
S K S	1	,,	Pressed pieces	...	,,	do.
	1	,,	Fair palish scrap	...	,,	do.
Kananbyle	1	,,	Very thick biscuits	...	,,	do.
F B	1	,,	Scrap very mixed	...	,,	4/-
	1	,,	Dark inferior scrap heated	...	,,	4/-
	2	,,	Cut pieces	...	,,	4/1½
Rangalla	1	,,	Dull Ceara biscuits	...	,,	bought in

Straits and Malay States.

R M P LTD	5	Cases	Crêpe mixed rather dark amber	...	,,	5/5
B M & C	19	,,	Very dark and part black mixed	...	,,	4/10½
	3	,,	Sheets very mixed colors and rough	...	,,	5/6
	4	pkgs.	Scrap	...	,,	2/9½ & 3/6

L E MUAR	20	cases	Fine black	...	,,	5/10
	1	,,	Dark crêpe	...	,,	5/-
	1	,,	Chip do.	...	,,	4/10
S P	5	,,	Darkish amber rolled sheets mouldy		,,	5/7
	2	,,	Mixed light and dark sheets	...	,,	5/6 & 5/7
	2	,,	Crêpe scrap	...	,,	4/10 & 4/11½
S R C	18	,,	Good dark amber sheets	...	,,	5/6¾ & 5/7
	2	,,	Pale and darkish Crêpe	...	,,	5/7
	4	,,	Part scrap Crêpe	...	,,	5/4¼
	1	,,	Dark Crêpe	...	,,	4/9½
V R C Klang F M S ooo	24	,,	Fine dark amber sheets	...	,,	5/6¾
	17	,,	Fine dark part a little mouldy	...	,,	5/6¾
	3	,,	Palish Crêpe	...	,,	5/4¾
	12	cases	Dark Crêpe	...	@	4/8¾ & 4/10
	1	,,	Black chip Crêpe	...	,,	4/4½
K	1	,,	Barky scrap	...	,,	3/5½
Caledonia	5	,,	Fine amber sheets	...	,,	5/7
S R R	10	,,	Rather mixed sheets	...	,,	5/6¾
Jebong	6	,,	Fine dark amber sheets	...	,,	5/7
S S R B C Ltd.	7	,,	do. do.	...	,,	5/7 & 5/7¼
Highlands Est.	11	,,	Fair darkish amber sheets slightly mouldy		,,	5/7
	3	,,	Palish and dark Crêpe mixed	...	,,	5/4
	3	,,	Dark crêpe	...	,,	4/10½
	5	,,	Brown and black crêpe	...	,,	4/10
B R R Co. Ltd.	29	,,	Very fine pale Crêpe	...	,,	bought in
	2	,,	Scrap Crêpe	...	,,	do.
	9	,,	Dark do.	...	,,	4/9¾
	3	,,	Chip do.	...	,,	4/8
	4	,,	Very fine pale clear Crêpe	...	,,	bought in

To-day's price of Fine Para: 5/1 per lb.

Next Auctions 12*th October*, 1906.

GOW, WILSON & STANTON, LIMITED—
India Rubber Market Report.

13, ROOD LANE, LONDON, E. C.
October 12th, 1906.

At to-day's auction, 407 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which about 232 were sold. The total weight amounted to about 23 tons, Ceylon contributing about 5¾ and Straits Settlements nearly 17¼.

There was a good market for all descriptions and competition was fairly general, though in a few cases sellers' ideas were not quite realized. Fine Plantation showed little change in price, although bidding was hardly as brisk.

A fine parcel of Crepe from the Bukit Rajah Estate realized up to 5/8 per lb. Best Sheet and Biscuits sold at from 5/6 to 5/7¼, whilst Good Scrap generally made very firm prices.

QUOTATIONS.—Fine sheet, 5/7¼
Fine biscuits, 5/7.
Good biscuits, 5/6
Crepe { Fine pale, 5/7¼ to 5/8.
Palish to darkish, 4/6 to 4/10¾.
Dark, 4/2 to 4/6.
Scrap { Fine, 4/6½.
Fair to medium, 3/9 to 4/4.
Low, 1/10¼ to 2/6.

PLANTATION FINE TO-DAY.—5/6 to 5/7¼, same period last year, 6/2.

DO. Scrap, 3/- to 4/6½, same period last year, 3/10 to 5/1¼.

FINE HARD PARA (South American) 5/1½, same period last year, 5/5.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

232 packages at 5/1¼ per lb., against 259 packages at 5/5¼ per lb. at last auction.

Particulars and prices as follows:—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Doranakande	5 cases good darkish biscuits, 5/7. 7 cases good palish to darkish scrap, 4/5¼. 3 cases black scrap, 4/2.
Tallagalla	2 cases fine large palish to darkish biscuits, 5/7¼. 1 case good palish pressed scrap, 4/6¼
Taldua	2 cases good darkish biscuits, 5/7.
Sirigalla	1 case fine pale to darkish biscuits, bought in. 1 case good palish scrap, 4/5.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB
C L	8 cases darkish crepe, bought in. 2 cases similar, 4/10¼. 4 cases little darker, 4/10. 2 cases thick darkish crepe, 4/10. 2 cases palish and darkish to black crepe, 4/5¾. 2 cases pressed scrap, 4/5. 1 case palish scrap, 4/5. 2 cases darker, 4/5 1 case similar, 4/5. 1 case pressed scrap and rejections, 4/3¼. 2 cases inferior scrap, 2/10½. 4 cases darkish crepe, 4/10¼. 2 cases pressed scrap, 3/11¼. 1 bag rejections, 4/2½.
Gikiyanikande	2 cases good palish pressed crepe in rolls, 5/5.
Heatherley	1 case fine pale amber biscuits, 5/7. 1 case similar, 5/7. 1 case fine pale pressed crepe, 5/7. 2 cases good darkish ditto, 5/2¼. 1 case black pressed crepe, 3/10.
Ellakande	1 case palish to darkish biscuits, 5/6¾. 1 case darkish pressed crepe, 5/1. 1 case black ditto, 4/2½. 1 case similar, 4/2½.
Arapolakande	8 cases good darkish biscuits, 5/7. 1 case dark scrap, 4/4.
S F	1 case palish to darkish rejected biscuits, bought in.
Ambatenne	3 cases inferior scrap, bought in.
Tallagalla	2 cases inferior scrap, bought in.
Kumbukkan	4 cases fine pale and palish biscuits, 5/7¼. 3 cases good darkish biscuits, 5/7. 1 case good palish to darkish pressed scrap, 4/5. 1 case good darkish biscuits, 5/7. 1 case dark lump scrap and rejections, 4/4½. 1 bag good pressed block scrap, 4/4½.
Kumaradola	1 case good palish to darkish biscuits, bought in. 2 cases little darker, bought in.
Udapolla	3 cases palish to darkish biscuits, bought in. 1 bag good palish scrap, 4/4. 1 bag lump scrap and rejections, 4/0½.
D	1 case darkish crepe, bought in.
L	10 cases darkish crepe, bought in.

STRAITS SETTLEMENTS.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
F J R	3 cases block scrap, bought in.
SP S	1 bag lump scrap, 4/5.
SP	1 case darkish sheet and rejected biscuits, 5/6.
F J R	3 cases pressed scrap, bought in.
Teluk Batu	14 cases good palish to darkish sheet, 5/6 to 5/6¼. 4 cases palish pressed scrap, 4/5½. 1 case black pressed crepe, 3/7½. 1 bag rejected biscuits, 4/2.
Beverlac	7 cases fine palish to darkish sheet, bought in. 11 cases good palish to darkish sheet, bought in. 4 cases palish to darkish scrap, 4/5¼. 3 cases inferior dark scrap, 1/10¼. 1 case dark lump scrap, 3/7.
B C	4 cases fair pressed scrap, 4/5.
B C A	4 cases pressed rejections, 3/11.
B C B	1 case darkish crepe, 4/9¾.
Brink	2 bags darkish to black crepe, 4/6½.
H S E	9 cases palish scored sheet, bought in.
A	2 cases good palish to darkish sheet, bought in.
B	1 case darkish pressed scrap, bought in.
C	1 case rejections, 4/4. 1 bag rejected biscuits, bought in.
A	2 cases good palish to darkish sheet bought in.

Mark.	Quantity, Description and Price per lb.
B	1 case darkish scrap, bought in.
B & C	1 case rejections, 4/4.
P S P R	14 cases good palish to darkish scored sheet, bought in. 1 case fine palish sheet, bought in. 7 cases good palish pressed crepe, 5/5.
A	2 cases good palish to darkish sheet, bought in.
B	1 case good palish to dark scrap, bought in.
C	1 bag rejections, 4/4. 1 bag rejections from biscuits, 4/4.
S R Co	20 cases fine palish to darkish scored sheet, bought in. 10 cases dark pressed scrap, 4/10¼. 2 cases darker 4/4¾.
VRCO Klang FMS	15 cases fine palish to darkish scored sheet, 5/6½. 1 case ditto darker, 5/6¼. 4 cases good palish pressed crepe, 5/5. 13 cases darker, 4/10¾. 3 cases very dark, 4/4½. 23 cases fine scored sheet, bought in. 1 case darker, bought in. 2 cases palish pressed crepe, 5/5. 4 cases darker, 5/1½.
GULA	6 cases fine large palish to darkish sheet, 5/6¾.
P B S B	9 cases good darkish sheet, bought in.
R R S S R	4 cases good palish sheet, 5/6½.
S	2 cases good pressed scrap, 4/5½. 2 cases pressed rejections, 4/1. 1 bag rejections from biscuits, 4/7.
B R R Co Ld.	18 cases fine palish crepe, 5/7½ to 5/8. 7 cases good palish to darkish crepe, bought in. 5 cases darker, 5/2. 1 case darkish crepe, 4/10. 16 cases fine pale and palish amber crepe, bought in. 2 cases darker, 5/4¾.
S SBRCoLd	4 cases fine large palish sheet, bought in. 1 case good palish to darkish scrap, 4/5½.
B U E	5 cases fine palish to darkish scored sheet, bought in 1 case good palish to darkish thick crepe, 5/3¼. 1 case darker, 4/11½.

GOW, WILSON & STANTON, LIMITED—
India Rubber Market Report.

13, Rood Lane, London, E.C.
October 26th, 1906.

At to-day's auction, 266 packages of Ceylon and Straits Settlements Plantation grown rubber were under offer, of which about 131 were sold. The total weight amounted to about 15½ tons, Ceylon contributing about 5 and Straits Settlements over 10½.

The quantity of Plantation Rubber brought forward was considerably less than during the last few auctions. Bidding generally was strong and prices showed a slight improvement.

The highest figure was 5/9¾ for an exceptionally fine parcel of Crepe from the Jebong Estate. Among the Ceylons some particularly good biscuits from Heatherley Estates realized 5/7¾.

Scrap also was well competed for and brought full prices.

QUOTATIONS.—Fine sheet, 5/7¼.
Fine biscuits, 5/7¾.
Good biscuits, 5/6.
Crepe { Fine pale, 5/7¼ to 5/9¾.
Crepe { Palish to darkish, 4/9 to 5/1.
Crepe { Dark, 4/2 to 4/6.
Scrap { Fine, 4/10¾.
Scrap { Fair to medium, 3/9 to 4/4.
Scrap { Low, 1/10¼ to 2/6.

PLANTATION FINE TO-DAY—5/6 to 5/7¾, same period last year, 6/0¾.
Do. SCRAP—3/- to 4/10¾, same period last year, 3/- to 5/0½.
FINE HARD PARA (South American).—5/3, same period last year, 5/4.

AVERAGE PRICE OF CEYLON AND STRAITS SETTLEMENTS PLANTATION RUBBER.

131 packages at 5/2¼ per lb., against 232 packages at 5/1¼ per lb. at last auction.

Particulars and prices as follows :—

Ceylon.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
Waharaka	2 cases good darkish biscuits, bought in. 3 cases darkish mixed scarp, bought in.
Tallagalla	1 case fine darkish biscuits, 5/7. 1 case good palish block scrap, 4/9. 1 case inferior mixed scrap, 3/10.
Ambatenne	1 case good palish to darkish biscuits, 5/7. 1 case darker, 5/7. 1 case good palish scrap, 4/10½. 1 case darker and inferior, 4/-.
Warriapolla	1 case good pale biscuits, 5/7. 1 case fine palish biscuits, 5/6¾. 1 case somewhat darker, 5/6¾. 1 case darkish biscuits, 5/5. 1 case good palish pressed scrap, 4/10.
Heatherley	1 case very fine pale and palish amber biscuits, 5/7¾. 1 case darkish pressed crepe, 5/2. 1 case black, 4/5. 3 cases very fine pale and palish amber biscuits, 5/7½.
Culloden	4 cases good palish to darkish biscuits, bought in. 4 cases fine palish to darkish pressed crepe, 5/7¼. 8 cases darker, 5/3. 1 case dark, 4/10½. 1 case black, 4/8.
MAK	1 case palish to darkish biscuits and rejections, 5/4. 1 case palish heated scrap, bought in. 1 bag palish to darkish crepe, bought in.
C R RW&Co. E	9 cases fine large darkish sheet, 5/6½. 2 cases palish pressed scrap, 4/6½. 2 cases dark scrap, and rejections, 4/2. 1 case palish to darkish sheet rejections, bought in. 1 bag somewhat similar, bought in. 1 bag darkish pressed scrap, 4/3½.

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.
OBEC	5 cases fine darkish sheet, 5/6½. 1 case pressed rejections, 4/5.
Kondesalle	
S F	1 case small palish biscuits, bought in.
Ambatenne	3 cases very inferior dark scrap, bought in.
Tallagalla	2 cases very inferior dark scrap, bought in.
Glanrhos	5 cases good palish to darkish biscuits, bought in.
Clontarf	2 cases good darkish biscuits, 5/6. 1 case darkish and dark crepe, 4/11.
Aberdeen	2 cases fine palish to darkish biscuits, 5/6¾. 2 cases darker, 5/6¾. 1 case fine pressed scrap, 4/7¼. 1 case thick rejections, 4/4.
F B	2 cases pale to dark biscuits, 5/2½. 1 case rejections from sheet, etc., 3/11.
Wevekellie	1 case palish biscuits, 5/7.

STRAITS SETTLEMENTS.

B R R Co Ld.	3 cases good palish to darkish crepe, bought in. 11 cases good palish to darkish scored sheet, bought in. 9 cases darkish crepe, 5/1. 2 cases darkish mixed crepe, 4/9½.
R M P LTD	16 cases good palish crepe, bought in. 7 cases good darkish to dark crepe, 5/-.
F J R	4 cases block scrap, bought in. 3 cases block scrap, bought in.
A MCI	1 case good palish sheet, 5/5½.
SD PST	
SD ,, B PSP	1 case darkish cut scrap, 4/5¼.
SD ,, C PST	1 case fine pale sheet, 5/7.
SD ,, D PSP	1 case darkish rejected sheet, 3/9. 1 case darkish cut scrap, 4/3¾.
SD ,, E PST	1 case palish to darkish sheet, 5/6¾.
MGI 2	1 case good darkish biscuits, 5/6.
CD PB	
CD ,, PSP	1 case palish scrap, 4/4½. 1 bag rejections from biscuits, 4/4.
G K K B	1 case fine pale sheet, 5/7¼. 1 case similar, 5/7¼. 1 case cut ball scrap, 4/2. 1 case rejections from biscuits and scrap, 4/4¾.
S R C	24 cases good palish to darkish scored sheet, bought in.
P B	2 cases fine palish to darkish sheet, 4/7¼. 14 cases good darkish scrap and rejections, 4/7¼.
S B	
E B & Co.	1 case good pressed sheet, rejections and palish to darkish scrap, 4/6.

Mark.	Quantity, Description and Price per lb.
V R CO. Klang FMS	17 cases good darkish scored sheet, bought in.
Sungei Krudda	6 cases good palish and darkish sheet, bought in. 5 cases good palish to darkish scrap, 4/5.
Jebong	11 cases good darkish sheet, bought in. 5 cases fine pale crepe, 5/9¾. 6 cases good palish to darkish crepe, bought in. 2 cases darkish crepe, bought in. 2 cases ditto, darker and heated, 4/9.
S SBRCoLd	6 cases fine dark sheet, bought in. 1 case pressed scrap, 4/2. 2 cases palish pressed scrap, bought in. 4 cases large palish to darkish sheet, 5/7.

LEWIS AND PEAT'S CEYLON, STRAITS AND MALAY STATES PLANTATION RUBBER REPORT.

12th October, 1906.

The following lots comprising about 16 tons Straits and Malay States and about 6 tons Ceylon were offered at the acutions and sold as follows :—

Straits and Malay States.

					per lb.
F J R	3	Cases	clean Red Rambong ...	@	bought in.
SP	1	,,	Biscuits and thick dark sheets, mixed	,,	5/6
Teluk Batu	14	,,	Sheets fair part dark ...	,,	5/6 & 5/6¼
	4	,,	Good scrap ...	,,	4/5½
S R Co.	20	,,	Fine dark sheets ...	,,	bought in.
	10	,,	Dark crepe ...	,,	4/10¼
	2	,,	Black chip crepe ...	,,	4/4¾
V R Co Klang F M S	15	,,	Fine amber sheets ...	,,	5/6½
	1	,,	Darkish ...	,,	5/6¼
	13	,,	Good dark crepe ...	,,	4/10¾
	3	,,	Chip crepe ...	,,	4/4½
	23	,,	Fine amber biscuits ...	,,	bought in.
	1	,,	Darkish ...	,,	bought in.
	2	,,	Scrap crepe ...	,,	5/5
	4	,,	Darkish crepe ...	,,	5/1½
GULA	6	,,	Palish sheets ...	,,	5/6¾
Yam Seng	9	,,	Fine dark amber sheets ...	,,	bought in.
R R S S R	4	,,	Palish sheets badly dried ...	,,	5/6½
	2	,,	Fair palish scrap ...	,,	5/4½
	2	,,	Black scrap ...	,,	4/1
B C	4	,,	Fair pale scrap little barky ...	,,	4/5

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.			
	1 ,,	Dark scrap crepe	... ,,	/9¾
H S E	9 ,,	Pale sheets	... ,,	bought in.
A	6 ,,	Amber sheets	... ,,	bought in
B	3 ,,	Scrap	... ,,	bought in.
C	3 pkgs.	Pieces	... ,,	4/4
P S P R	14 cases	Darkish sheets	... ,,	bought in.
	1 ,,	Pale sheets	... ,,	bought in
	7 ,,	Mottled crepe	... ,,	5/5.
B R R Co Ltd.	18 ,,	Fine even pale crepe	... ,,	5/7½ & 5/8
	7 ,,	Dark and mottled	... ,,	bought in.
	5 ,,	Scrap crepe	... ,,	5/2
	1 ,,	Brown chip	... ,,	4/10
B R R Co Ld.	16 ,,	Fine clean amber crepe	... ,,	bought in.
	2 ,,	Dark	... ,,	5/4¾
B U E	5 ,,	Fine darkish sheets	... ,,	bought in.
	1 ,,	Scrap crepe	... ,,	5/3¼
	1 ,,	Chip crepe	... ,,	4/11½
SSBRCoLd.	4 ,,	Fine large amber sheets	... ,,	bought in.
	1 ,,	Fair scrap	... ,,	4/5½
Beverlac	7 ,,	Large darkish amber sheets	... ,,	bought in.
	11 ,,	Thin palish sheets	... ,,	bought in.
	4 ,,	Fair brown scrap	... ,,	4/4¼
	3 ,,	Dirty inferior	... ,,	1/10¼
	1 ,,	Nuggets and pieces	... ,,	3/7

Ceylon.

Doranakande	5 cases	Dark biscuits	... @	5/7
	7	Scrap	... ,,	4/5¼
	3 ,,	Black scrap	... ,,	4/2
Tallagalla	3 ,,	Good darkish biscuits mixed	... ,,	5/6¾ & 5/7¼
	2 ,,	Fair palish scrap	... ,,	4/5 & 4/6¼
Taldua	2 ,,	Biscuits mixed colors	... ,,	5/7
Heatherley	2 ,,	Fine pale biscuits	... ,,	5/7
	1 ,,	Very fine pale crepe	... ,,	5/7
	2 ,,	Scrap crepe	... ,,	5/2¼
	1 ,,	Chip crepe run	... ,,	3/10
Ellakande	1 ,,	Fine biscuits mixed colors	... @	5/6¾
	1 ,,	Scrap crepe	... ,,	5/1
	2 ,,	Chip crepe	... ,,	4/10½
Arapolakande	8 ,,	Fine dark smoked biscuits	... ,,	5/7
	1 ,,	Dark scrap	... ,,	4/4
C D	8 ,,	Mottled crepe	... ,,	bought in.
	6 ,,	Scrap crepe	... ,,	4/10 & 4/10½
	2 ,,	Chip and crepe	... ,,	4/10
	2 ,,	Black chip	... ,,	4/5¾
	4 ,,	Fair	... ,,	4/5

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.					
Kumbukkan	4	,,	Fine palish biscuits	...	,,	5/7¼
	3	,,	Dark	...	,,	5/7
	1	,,	Fair scrap	...	,,	4/5
	1	,,	Mixed biscuits	...	,,	5/7
	1	,,	Scrap and rejected biscuits	...	,,	4/4¼
Kumaradola	1	,,	Pale amber biscuits	...	,,	bought in.
	2	,,	Darkish	...	,,	bought in.
Sirigalla	1	,,	Good biscuits mixed colors	...	,,	bought in.
	1	,,	Fair scrap little barky	...	,,	4/5
Gikoyanakande	2	,,	Fine palish crepe in rolls	...	,,	5/5
Ingoya and Langsland			A few cases fine biscuits 5/6¾ (whole parcel not ready for sale.)			
Udapolla	3	,,	Mixed mottled biscuits	...	,,	5/6

LEWIS AND PEAT'S CEYLON, STRAITS AND MALAY STATES PLANTATION RUBBER REPORT.

26th October, 1906.

The following lots comprising about 4¾ tons Ceylon and about 10¼ tons Straits and Malay States were offered at auction to-day and sold as follows:—

Ceylon.

						per lb.
Waharaka	2	Cases	Dark biscuits	...	@	bought in.
	3	,,	Dark barky scrap	...	,,	3/10½
Tallagalla	1	,,	Good darkish biscuits	...	,,	5/7
	1	,,	Fair brown scrap in cakes	...	,,	4/9
	1	,,	Dark barky scrap	...	,,	3/10
Ambatenne	2	,,	Fine darkish biscuits	...	,,	5/7
	1	,,	Good brown scrap	...	,,	4/10½
	1	,,	Dark scrap	...	,,	4/-
Warriapolla	2	,,	Pale Ceara biscuits	...	,,	5/6¾ & 5/7
	1	,,	Amber Ceara biscuits	...	,,	5/6¾
	1	,,	Black biscuits	...	,,	5/5
Glanrhos	5	,,	Biscuits mixed colors	...	,,	bought in.
Clontarf	2	,,	Palish biscuits	...	,,	5/6
	1	,,	Scrap and chip crepe	...	,,	4/11
Aberdeen	4	,,	Amber biscuits	...	,,	5/6¾
	1	,,	Brown scrap	...	,,	4/7¼
Heatherley	4	,,	Fine pale biscuits	...	,,	5/7½ & 5/7¾
	1	,,	Brown crepe	...	,,	5/2
	1	,,	Chip crepe	...	,,	4/5
Culloden	4	,,	Fine pale biscuits	...	,,	bought in.
	4	,,	Pale crepe fine	...	,,	5/7¼
	8	,,	Scrap crepe	...	,,	5/3
	2	,,	Chip crepe	...	,,	4/8 & 4/10½
MAK	1	,,	Very mixed biscuits	...	,,	5/4
	1	,,	Brown scrap	...	,,	bought in.
C R R W Co. E	9	,,	Fine large amber sheets	...	,,	5/6½

MARK.	QUANTITY, DESCRIPTION AND PRICE PER LB.			
	2 ,,	Fair brown scrap ...	,,	4/6½
	2 ,,	Nuggets and scrap ...	,,	4/2
OBEC	5 ,,	Very fine amber sheets ...	,,	5/6½
	1 ,,	Scrap ...	,,	4/5

Straits and Malay States.

MRP LTD	16 cases	Brown and mottled crepe good clean strong ...	,,	bought in.
	7 ,,	Dark crepe ...	,,	5/-
Mc I	1 ,,	Sheets stuck ...	,,	5/5½
	1 ,,	Scrap in sheets ...	,,	4/5¼
	1 ,,	Good pale sheets ...	,,	5/7
	1 ,,	Pieces and scrap ...	,,	3/9
	1 ,,	Pale sheets ...	,,	5/6¾
	1 ,,	Mixed biscuits rather mouldy ...	,,	5/6
G KK B	2 ,,	Good pale sheets ..	,,	5 /7¼
	1 ,,	Ball scrap ...	,,	4/2
	1 ,,	Pieces and ball scrap ...	,,	4/4¾
Jebong	11 ,,	Large dark amber sheets ...	,,	bought in.
	5 ,,	Fine pale crepe, close and bright ...	,,	5/9¾
	6 ,,	Mottled ,, ...	,,	bought in.
	2 ,,	Dark ,, ...	,,	bought in.
	2 ,,	Chip and scrap crepe ...	,,	4/9
S S B R Co. Ltd.	6 ,,	Large amber sheets ...	,,	bought in
Sungei Krudda	6 cases	Dark Amber sheets ...	@	bought in.
	5 ,,	Darkish scrap ...	,,	4/5
B R R Co Ltd.	3 ,,	Mottled crepe ...	,,	bought in.
	11 ,,	Darkish sheets ...	,,	bought in.
	9 ,,	Dark mottled scrap crepe ...	,,	5/1
	2 ,,	Scrap crepe ...	,,	4/9½
S R C	24 ,,	Pale rolled sheets ...	,,	bought in.
P B	2 ,,	Large amber sheets ...	,,	bought in.
S B	14 ,,	Fair brown scrap pieces and nuggets ...	,,	4/7¼
V R Co. Klang F. M. S.	17 ,,	Rolled sheets ...	,,	bought in.

To-day's price Fine Para 5/2¾ per lb.

REGISTER OF RAINFALL AT NEGRI SEMBILAN HOSPITALS FOR OCTOBER, 1906.

Date.	Seremban.		K. Pilah.		Tampin.		Jelebu.		Port Dickson.		Mantin.	
	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.
1	...	20	...	05	...	...	...	43	1	40	...	53
2	...	...	...	...	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	04	...	21	...	...
4	...	...	...	06	...	...	...	37	...	...	...	...
5	...	...	...	03	..	...	...	27	...	...	...	03
6	...	19	...	47	...	30	...	23	...	...	...	...
7	1	20	...	27	1	00	...	23	...	15	...	67
8	...	11	...	...	...	10	...	15	1	68	...	64
9	1	20	...	45	...	36	...	...	2	30	...	34
10	...	30	...	18	...	60	...	40	1	30	...	84
11	...	...	...	...	...	...	...	...	...	23	...	...
12	...	...	...	...	...	10	...	07	...	65	...	32
13	...	...	...	...	...	15	...	02	...	21	...	04
14	...	...	...	..	...	...	...	31	..	...	...	...
15	...	...	...	03	...	20	...	05	...	...	...	20
16	...	40	...	11	...	...	...	13	...	76	...	11
17	...	90	1	11	...	...	...	12	...	58	...	23
18	...	...	...	30	...	...	1	31	...	18	...	...
19	...	30	2	10	...	20	...	27	...	18	...	95
20	...	70	...	11	2	30	...	...	...	45	...	...
21	2	35	1	40	...	10	...	20	...	98	...	17
22	...	10	...	65	...	36	...	...	...	11	...	14
23	...	...	...	09	...	10	...	...	...	...	...	...
24	..	...	...	...	...	...	...	...	...	...	...	...
25	...	67	1	20	1	60	1	62	2	79	...	87
26	...	03	...	11	...	...	...	20	...	05	...	06
27	...	...	...	09	...	02	...	02	...	...	...	02
28	...	97	1	21	1	50	...	65	...	26	...	47
29	...	...	...	05	...	40	...	07	...	...	...	03
30	...	...	...	...	...	...	...	...	...	...	...	...
31	...	...	...	...	...	...	...	...	...	...	...	...
Total	9	62	10	07	9	39	7	16	14	47	6	66

State Surgeon's Office,
Seremban, 13*th November*, 1906.

R. VAN GEYZEL,
Apothecary.

SINGAPORE MARKET REPORT.

October, 1906.

Articles.	Quantity sold.	Highest price.	Lowest price.
	Tons.	$ c.	$ c.
Coffee—Palembang	...	...	...
Bali	132	19.50	19.00
Liberian	100	22.00	20.00
Copra	2,290	10.00	8.60
Gambier	1,430	7.00	6.90
Cube Gambier, Nos. 1 and 2	235	11.20	10.50
Gutta Percha, 1st quality	...	300.00	190.00
Medium	...	200.00	100.00
Lower	...	80.00	25.00
Borneo Rubber 1, 2 and 3	...	128.00	70.00
Gutta Jelutong	...	6.27½	5.90
Nutmegs, No. 110's	...	31.00	28.00
No. 80's	...	49.00	46.00
Mace, Banda	...	105.00	100.00
Amboyna	...	75.00	72.00
Pepper, Black	645	21.00	19.65
White (Sarawak)	526	27.45	26.62
Pearl Sago, Small	186	4.15	4.00
Medium	15	...	...
Large	...	...	...
Sago Flour, No. 1	2,830	3.07½	2.77½
No. 2	310	1.15	1.10
Flake Tapioca, Small	560	9.00	8.30
Medium	...	...	...
Pearl Tapioca, Small	117	...	...
Medium	376	9.10	8.25
Bullet	...	11.25	11.25
Tin	1,705	99.50	96.37½

EXPORTS TELEGRAM TO EUROPE AND AMERICA.

Fortnight ending 15th October, 1906.

Wired at 2.45 p. m. on 16th October, 1906.

				Tons.
Tin	Str.	Singapore & Penang to	United Kingdom &/or	1,395
Do.	,,	Do.	U. S. A.	685
Do.	,,	Do.	Continent	317
Gambier	,,	Singapore	Glasgow	...
Do.	,,	Do.	London	...
Do.	,,	Do.	Liverpool	100
Do.	,,	Do.	U. K. &/or Continent	140
Cube Gambier	,,	Do.	United Kingdom	10
Black Pepper	,,	Do.	Do.	30
Do.	,,	Penang	Do.	50
White Pepper	,,	Singapore	Do.	140
Do.	,,	Penang	Do.	10
Pearl Sago	,,	Singapore	Do.	5
Sago flour	,,	Do.	London	250
Do.	,,	Do.	Liverpool	1,200
Do.	,,	Do.	Glasgow	200
Tapioca, Flake	,,	Singapore & Penang	United Kingdom	190
T. Pearl & Bullets	,,	Do.	Do.	190
Tapioca Flour	,,	Penang	Do.	270
Gutta Percha	,,	Singapore	Do.	75
Buffalo Hides	,,	Do.	Do.	120
Pineapples	,,	Do.	Do.	600
Gambier	,,	Do.	U.S.A.	600
Cube Gambier	,,	Do.	Do.	25
Black Pepper	,,	Do.	Do.	160
Do.	,,	Penang	Do.	110
White Pepper	,,	Singapore	Do.	65
Do.	,,	Penang	Do.	10
Tapioca Pearl	,,	Singapore & Penang	Do.	210
Nutmegs	,,	Do.	Do.	15
Sago Flour	,,	Singapore	Do.	200
Pineapples	,,	Do.	Do.	2,750
Do.	,,	Do.	Continent	1,750
Gambier	,,	Do.	South Continent	40
Do.	,,	Do.	North Continent	200
Cube Gambier	,,	Do.	Continent	40
Black Pepper	,,	Do.	South Continent	150
Do.	,,	Do.	North Do.	85
Do.	,,	Penang	South Do.	10
Do.	,,	Do.	North Do.	...
White Pepper	,,	Singapore	South Do.	30
Do.	,,	Do.	North Do.	70
Do.	,,	Penang	South Do.	5
Do.	,,	Do.	North Do.	20
Copra	,,	Singapore & Penang	Marseilles	50
Do.	,,	Do.	Odessa	...
Do.	,,	Do.	Other South Continent	880
Do.	,,	Do.	North Continent	240
Sago Flour	,,	Singapore	Continent	575
Tapioca, Flake	,,	Singapore & Penang	Do.	190
Tapioca, Pearl	,,	Do.	Do.	20
Do. Flake	,,	Do.	U. S. A.	20

				Tons.
Gambier	,,	Do.	Do.	...
Cube Gambier	,,	Do.	Do.	...
T. Flake and Pearl	,,	Do.	Do.	...
Sago Flour	,,	Do.	Do.	...
Gambier	,,	Do.	S. Continent	...
Copra	,,	Do.	Marseilles	...
Black Pepper	,,	Do.	S. Continent	...
White Pepper	,,	Do.	Do.	...
Do.	,,	Do.	U. S. A.	...
Pineapples	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Black Pepper	,,	Do.	Do.	...
Do.	,,	Penang	Do.	...
White Pepper	,,	Do.	Do.	...
T. Flake and Pearl	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Copra	,,	Singapore	England	...

900 tons Gambier 375 ,, Black Pepper	Contracts

Exports Telegram to Europe and America.

Fortnight ending 31st October, 1906.

Wired at 4.30 p. m. on 1st November, 1906.

Tin	Str.	Singapore & Penang to	United Kingdom &/or	1,200
Do.	,,	Do.	U. S. A.	750
Do.	,,	Do.	Continent	320
Gambier	,,	Singapore	Glasgow	...
Do.	,,	Do.	London	...
Do.	,,	Do.	Liverpool	...
Do.	,,	Do.	U. K. &/or Continent	25
Cube Gambier	,,	Do.	United Kingdom	10
Black Pepper	,,	Do.	Do.	60
Do.	,,	Penang	Do.	...
White Pepper	,,	Singapore	Do.	110
Do.	,,	Penang	Do.	10
Pearl Sago	,,	Singapore	Do.	...
Sago Flour	,,	Do.	London	400
Do.	,,	Do.	Liverpool	...
Do.	,,	Do.	Glasgow	...
Tapioca, Flake	,,	Singapore & Penang	United Kingdom	95
T. Pearl & Bullets	,,	Do.	Do.	100
Tapioca Flour	,,	Penang	Do.	350
Gutta Percha	,,	Singapore	Do.	10
Buffalo Hides	,,	Do.	Do.	25
Pineapples	,,	Do.	Do.	500
Gambier	,,	Do.	U. S. A.	1,150
Cube Gambier	,,	Do.	Do.	10
Black Pepper	,,	Do.	Do.	90
Do.	,,	Penang	Do.	50
White Pepper	,,	Singapore	Do.	65
Do.	,,	Penang	Do.	10
Tapioca, Pearl	,,	Singapore & Penang	Do.	110
Nutmegs	,,	Do.	Do.	32
Sago Flour	,,	Singapore	Do.	125

				Tons.
Pineapples	,,	Do.	Do.	4,250
Do.	,,	Do.	Continent	3,000
Gambier	,,	Do.	S. Continent	...
Do.	,,	Do.	N. Continent	50
Cube Gambier	,,	Do.	Continent	90
Black Pepper	,,	Do.	S. Continent	190
Do.	,,	Do.	N. Continent	25
Do.	,,	Penang	S. Continent	5
Do.	,,	Do.	N. Continent	50
White Pepper	,,	Singapore	S. Continent	5
Do.	,,	Do.	N. Continent	30
Do.	,,	Penang	S. Continent	5
Do.	,,	Do.	N. Continent	5
Copra	,,	Singapore & Penang	Marseilles	800
Do.	,,	Do.	Odessa	720
Do.	,,	Do.	Other S. Continent	780
Do.	,,	Do.	N. Continent	500
Sago Flour	,,	Singapore	Continent	240
Tapioca, Flake	,,	Singapore & Penang	Continent	330
Tapioca, Pearl	,,	Do.	Continent	110
Do. Flake	,,	Do.	U. S. A.	10
Gambier	,,	Do.	Do.	...
Cube Gambier	,,	Do.	Do.	...
T. Flake and Pearl	,,	Do.	Do.	...
Sago Flour	,,	Do.	Do.	...
Gambier	,,	Do.	S. Continent	...
Copra	,,	Do.	Marseilles	...
Black Pepper	,,	Do.	S. Continent	...
White Pepper	,,	Do.	Do.	...
Do.	,,	Do.	U. S. A.	...
Pineapples	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Black Pepper	,,	Do.	Do.	...
Do.	,,	Penang	Do.	...
White Pepper	,,	Do.	Do.	...
T. Flake & Pearl	,,	Do.	Do.	...
Nutmegs	,,	Do.	Do.	...
Copra	,,	Singapore	England	..

950 tons Gambier }
280 ,, Black Pepper } Contracts.

Singapore.

Abstract of Meteorological Readings for the month of October, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F.	°F.	°F.	°F.	°F.	°F.	Ins.	°F	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory	29·889	142·3	80·2	87·5	75·0	12·5	77·2	·875	75·2	83	WSW N. W.	12·41	2·41

A. B. LEICESTER,
Meteorological Observer.

T. C. MUGLISTON,
Principal Civil Medical Officer, S. S.

KANDANG KERBAU HOSPITAL OBSERVATORY,
SINGAPORE, 21*st November*, 1906.

Penang.

Abstract of Meteorological Readings in the Prison Observatory for the month of October, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory … …	29·917	151·4	79·9	88·1	73·9	14·2	76·9	·860	74·86	79·0	N.W	8·33	2·50

PRISON OBSERVATORY,
PENANG, 12*th November*, 1906.

M. E. SCRIVEN,
Assistant Surgeon.

E. N. GRAHAM,
for Colonial Surgeon, Penang.

Malacca.

Abstract of Meteorological Readings for the month of October, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Durian Daun Hospital	29·831	156·2	79·6	90·0	70·3	19·9	81·5	1·062	63·1	95	N.W.	17·66	3·74

COLONIAL SURGEON'S OFFICE,
MALACCA, 28*th November*, 1906.

F. B. CROUCHER,
Colonial Surgeon, Malacca.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of October, 1906.

DISTRICT.		Maximum in Sun.	Temperature.				Hygrometer.			Total Rainfall.	Greatest rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Humidity.		
Taiping	...	149	82·35	94	71	23	77·62	884	81	18·51	3·49
Kuala Kangsar	...	...	80·46	93	70	23	76·46	858	82	9·70	2·80
Batu Gajah	...	160	81·20	92	71	21	76·81	865	81	6·94	2·50
Gopeng	...	...	80·60	95	67	28	76·72	869	84	11·54	2·31
Ipoh	...	...	81·10	92	74	18	77·24	885	84	6·79	·88
Kampar	...	...	...	94	70	24	...	...	...	7·20	1·80
Teluk Anson	...	...	81·63	94	70	24	77·24	878	82	9·06	1·77
Tapah	...	..	81·50	93	69	24	76·84	862	80	14·86	3·80
Parit Buntar	...	...	82·73	92	69	23	77·44	872	78	3·78	1·30
Bagan Serai	...	...	82·27	93	69	24	77·22	868	79	5·96	2·27
Selama	...	...	80·74	94	71	23	76·78	870	84	13·55	4·40

STATE SURGEON'S OFFICE,

TAIPING, 12*th November*, 1906.

S. C. G. FOX,

Acting State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of October, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·878	142·0	79·8	89·6	71·7	17·8	76·0	0·830	74·5	82	Calm.	12·15	3·60
Pudoh Gaol Hospital ,, ...	...	...	...	...	...	...	...	...	...	...	...	11·82	2·51
District Hospital ,, ...	...	...	...	...	...	...	...	...	...	...	...	14·28	3·32
,, Klang	...	...	...	86·8	69·4	17·4	...	...	...	...	...	8·26	1·88
,, Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	9·69	1·44
,, Kajang	...	...	...	89·8	72·2	17·6	...	...	...	...	...	11·59	1·73
,, Kuala Selangor	...	...	...	...	...	...	...	...	...	...	...	3·75	0·50
,, Kuala Kubu	...	...	...	...	...	...	...	...	...	...	...	19·05	2·99
,, Serendah	...	...	...	90·7	68·6	22·1	...	...	...	...	...	10·46	2·94
,, Rawang	...	...	...	90·4	71·7	18·7	...	...	...	...	...	12·56	2·95
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	14·06	4·18
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	...	9·12	1.61

STATE SURGEON'S OFFICE,

KUALA LUMPUR, 22*nd November*, 1906.

E. A. O. TRAVERS,

State Surgeon, Selangor.

The Duff Development Company, Limited, Kelantan.

Abstract of Meteorological Readings for the month of October, 1906.

DISTRICT.	Temperature.			Rainfall.	
	Maximum.	Minimum.	Range.	Total Rainfall.	Greatest Rainfall during 24 hours.
	Mean. °F	Mean. °F	Mean. °F	Inches.	Inches.
Kuala Lebir ...	86·2	70·8	15·3	10·28	3·03
Serasa ...	91·0	71·2	19·8	12·08	2·25
Kuala Kelantan ...	87·0	71·0	10·7	15·24	1·90

SURGEON'S OFFICE,
2nd November, 1906.

WISTON BAKER,
Surgeon.

METEOROLOGICAL OBSERVATIONS.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the Month of October, 1906.

Date.	Temperature of Radiation.										Wind.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Clouds and weather Initials.			Rain.
											Direction.																	
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference sun and shade.	Grass.	Difference shade and radiation.	9 H	15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	21 H	9 H	15 H	21 H	Inches.
	°	°	°	°	°	°	°	°	°	°			°	°	°	in.	in.	in.	°	°	°							
1	85	86	85·5	87	70	17	146	59	68	2	E.	E.	73·4	74	73·7	0·826	0·855	0·840	68	68	68	2	3	5	B	C	C	·20
2	80	84	82	85	71	14	135	50	68	3	E.	S.E.	75	75·7	75·3	·867	·888	·877	85	76	80·5	3	0	3	C	B	C	
3	78	86	82	88	71	17	146	58	69	2	S.E.	S.E.	72·9	74	73·4	·810	·855	·832	84	68	76	3	0	0	C	B	B	
4	81	87	84	88	71	17	141	53	68	3	S.E.	S.E.	76	75·5	75·7	·897	·884	·890	85	69	77	2	0	2	B	B	B	
5	80	86	83	87	72	15	145	58	70	2	E.	E.	75	74	74·5	·867	·855	·861	85	68	76·5	0	0	2	B	B	B	
6	80	84	82	84	72	12	115	31	70	2	S.E.	S.E.	75	75·7	75·3	·867	·888	·878	85	76	80·5	0	10	5	B	R	C	·19
7	78	79	78·5	80	71	9	105	25	68	3	S.E.	S.E.	72·9	73·9	73·4	·810	·839	·824	84	85	84·5	3	10	5	C	R	C	1·20
8	79	81	80	82	71	11	132	50	68	3	S.E.	S.E.	75·6	74	74·8	·888	·849	·868	90	80	85	3	5	5	C	C	C	·11
9	78	84	81	85	71	14	136	51	70	1	S.E.	S.E.	72·9	75·7	74·3	·810	·888	·849	84	76	80	3	3	5	C	C	C	1·20
10	80	86	83	87	71	16	140	53	69	2	S.E.	S.E.	75	77	76	·867	·955	·911	85	76	80·5	0	0	2	B	B	B	·30
11	78	85	81·5	86	72	14	132	46	69	3	S.E.	S.E.	72·9	71·8	72·3	·810	·781	·795	84	64	74	5	3	10	C	C	R	
12	75	80	77·5	85	72	13	130	45	70	2	S.E.	E.	71·6	71·6	71·6	·774	·775	·774	89	75	82	10	5	0	R	C	B	
13	80	81	80·5	82	73	9	124	42	70	3	E.	E.	76·6	76	76·3	·916	·897	·906	90	85	87·5	0	3	3	B	C	C	
14	81	86	83·5	87	72	15	146	59	69	3	S.E.	S.E.	76	77	76·5	·897	·955	·926	85	76	80·5	0	0	2	B	B	B	
15	81	81	81	82	72	10	132	50	69	3	S.E.	E.	74	74	74	·849	·849	·849	80	80	80	0	10	3	B	R	C	
16	82	83	82·5	84	71	13	147	63	69	2	E.	E.	75·3	74·7	75	·877	·856	·866	80	76	78	0	10	3	B	R	C	·40
17	80	81	80·5	82	71	11	140	58	69	2	E.	S.E.	76·6	74	75·3	·916	·849	·882	90	80	85	2	10	5	B	R	C	·90
18	78	79	78·5	80	71	9	135	55	70	1	S.E.	S.E.	72·9	73·9	73·4	·810	·839	.824	84	85	84·5	3	10	5	C	R	C	
19	82	88	85	90	71	19	127	37	69	2	S.E.	S.E.	75·3	85·7	80·5	·877	1·234	1·055	80	90	85	5	2	10	C	B	R	·30
20	80	86	83	87	73	14	134	47	69	4	S.E.	S.E.	75	74	74·5	·867	·855	·861	85	68	76·5	5	0	5	C	B	C	·70
21	75	80	77·5	82	72	10	135	53	69	3	S.E.	S.E.	71·6	71·6	71·6	·774	·775	·774	89	75	82	10	3	0	R	C	B	2·35
22	82	83	82·5	84	72	12	140	56	69	3	S.E.	S.E.	75·3	74·7	75	·877	·856	·866	80	76	78	0	0	0	B	B	B	·10
23	80	87	83·5	88	72	16	138	50	70	2	S.E.	S.E.	75	75·5	75·2	·867	·884	·875	85	69	77	0	0	0	B	B	B	
24	81	86	83·5	87	73	14	135	48	70	3	S.E.	S.E.	76	81	78·5	·897	1·064	·980	85	85	85	3	3	3	C	C	C	
25	78	80	79	81	74	7	126	45	70	4	E.	S.E.	72·9	73·3	73·1	·810	·820	·815	84	80	82	5	10	10	C	R	R	·67
26	82	83	82·5	84	72	12	137	53	70	2	S.	S.	75·3	78	76·6	·877	·956	·916	80	85	82·5	2	3	5	B	C	C	·03
27	80	89	84·5	91	74	17	148	57	70	4	S.	S.	76·6	85·7	81·1	·916	1·234	1·075	90	90	90	3	0	2	C	B	B	
28	82	83	82·5	85	73	12	145	60	68	5	E.	E.	75·3	74·7	75	·877	·856	·866	80	76	78	2	10	5	B	R	C	·97
29	77	82	79·5	83	73	10	124	41	70	3	E.	E.	73·6	73·6	73·6	·829	·830	.829	89	76	82·5	10	5	5	R	C	C	
30	78	83	80·5	83	73	10	120	37	70	3	E.	E.	74·6	78	76·3	·857	·956	·906	89	85	87	3	3	5	C	C	C	
31	82	90	86	92	72	20	147	55	69	3	E.	E.	75·3	88·4	81·8	·877	1·342	1·109	80	95	87·5	0	0	10	B	B	R	

Total 9·62

State Surgeon's Office,
Seremban, 13*th November*, 1906.

R. VAN GEYZEL,
Apothecary

NOTICE.

THE SCIENTIFIC AND TECHNICAL DEPARTMENTS OF THE IMPERIAL INSTITUTE.

His Excellency the Governor has received a despatch from the Right Hon'ble the Secretary of State for the Colonies calling attention to the advantages offered by the Imperial Institute to Merchants, Planters and others, who may wish to have samples submitted to scientific experts for opinion as to their commercial value, etc. The following extracts from a Memorandum published by the Authorities of the Imperial Institute will give an idea of the work undertaken and carried on there.

"The Scientific and Technical Department of the Institute has "been established to acquire information by special enquiries and "by experimental research, technical trials and commercial valua- "tion regarding new or little known natural or manufactured pro- "ducts of the various Colonies and Dependencies of the British "Empire and of Foreign Countries, and also regarding known "products procurable from new sources, and local products of "manufacture which it is desired to export. This work is carried "out with a view to the creation of new openings in trade, or the "promotion of industrial developments."

2. In an extensive and well equipped series of Research Laboratories, a numerous staff of skilled chemists under the direction of Professor WYNDHAM R. DUNSTAN, M. A., F. R. S., carry out the investigation of the chemical constitution and properties of new dye-stuffs, tanning materials, seeds and food-stuffs, oils, gums and resins, fibres, timbers, medicinal plants and products, with a view to their commercial utilization. Whenever necessary these materials are submitted to special scientific experts, by whom they are made the subject of particular investigation or practical tests. Reports are also obtained from technical or trade experts in regard to the probable commercial or industrial value of any such products, while full information is collected from official or other trustworthy sources regarding the probable extent and cost of available supplies.

Reports on the results of enquiries or experimental investigations are supplied as a rule, without charge, but should special expenses be incurred in connection with any such reports, or with the commercial value of particular materials or manufactured products, which the Council do not consider themselves warranted in meeting, a statement of such outlays will be furnished, for repayment, when the Reports are supplied. Should an investigation or report of exceptional character be asked for by a Government Department, an estimate of the attendant expenses will be submitted, with a view to ascertain whether authority for such expenditure will be given.

3. The Federated Malay States Government has undertaken to grant a sum of £100 a year for 5 years to the Department with a view to the careful investigation and commercial development of the mineral resources of the States.

The Government Geologist is collecting specimens for chemical examination and after analysis the Imperial Institute which is in very complete touch with the principal manufacturing and other industries of the United Kingdom, will bring the specimens before manufacturers and others for trial with a view to their commercial development.

It is expected that this action will do much to help in finding a market for new products and developing the markets for those already exploited.

AGRICULTURAL BULLETIN
OF THE
STRAITS
AND
FEDERATED MALAY STATES.

No. 12.] DECEMBER, 1906. [Vol. V.

THE SECOND ANNUAL REPORT
ON THE
Experimental Tapping of Para Rubber Trees in the Botanic Gardens, Singapore,
FOR THE YEAR 1905.

The Experimental research into the yield of latex and caoutchouc, the growth of trees and other points of importance bearing on the cultivation of Para Rubber trees was continued during the year. A clerk and from six to ten men were employed in the work, and their wages, the rebuilding of the drying house, and the necessary tools and chemicals for the work, were paid for out of the money obtained by the sale of the rubber prepared during the experiments as in the previous year. Though the price of rubber had fallen from 6/9*d*. per pound to 6/2*d*., the increased amount of rubber obtained, 1,110 lbs., as against 884 lbs., more than compensated for this fall.

The General Plan of the Research.

For the purpose of the experiments the same trees were used in 1905 as in 1904, but the experiments were modified both in method and in the periods of tapping. The spiral method of tapping so highly spoken of in Ceylon was experimented with, and the results are treated of separately, but as far as the series of experiments first to be detailed are concerned the herring-bone system only was adopted, and with it experiments in variation in yield due to evening and morning tappings, single and full incisions, and tapping every day and on alternate days were carried out. Investigations into the effects of tapping throughout the year, and to show whether the same groups of trees could be tapped more than once in the year without inflicting any injury on them were also carried out. For this purpose the figures of results obtained in 1906 up to the end of July have been included in the tables.

During the experiments, in addition to weighing carefully the dry rubber obtained from the separate groups of trees, the latex itself was first measured and this part of the experiments furnishes *the most interesting and important information* in connection with the experimental work of the year. The results show that there is much difference in the amount of rubber obtained from the same quantity of latex at different times in the year, at different times of the day (*i.e.* at morning and evening tappings) and from the same groups of trees when they have had a sufficient interval of rest, and when they have not. The story of this variation in the production of caoutchouc will be more clearly understood if we sketch briefly the following chapter in the life history of the trees.

A Chapter in the life history of Hevea braziliensis in Malaya.

The fruit periodicity of *Hevea braziliensis* in the Singapore Gardens from 1897 to 1905, or a period of nine years is shown in the record of returns of seeds procured (*see* page 441). The seeds gathered up to the end of October, 1906, is entered on the return but not included in the total for the preceding nine years. It should be remarked that this Return, although not strictly accurate in all details, is fairly approximate, and from this record we extract the following monthly returns for this period, arranged according to abundance of crops:—

September	324,515	seeds.
October	291,430	„
March	148,050	„
November	85,870	„
August	79,600	„
April	56,314	„
February	55,800	„
December	35,802	„
January	32,924	„
July	29,650	„
June	28,700	„
May	28,097	„

Record of Seeds of Hevea braziliensis procured from the trees in the Botanic Gardens, Singapore, from 1897-1905.

—	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	Total collected in each month for past 9 years.
January -	Nil.	7,250	2,900	400	7,500	Nil.	520	9,654	4,700	Nil.	32,924
February -	200	22,800	900	8,200	12,900	Nil.	700	9,800	300	1,870	55,800
March -	1,900	33,300	4,200	13,700	43,050	50	32.400	19,450	Nil.	4,730	148,050
April -	2,950	17,100	2,150	2,600	6,200	4,050	19 010	500	1,754	14,110	56,314
May -	1,760	1,750	1,100	1,000	2,000	7,000	8,950	2,700	1,837	24,825	28,097
June -	3,100	2,400	400	1,000	3,000	8,200	Nil.	7,500	3,100	6,750	28,700
July -	2,700	1,600	2,100	2,900	Nil.	6,600	800	6,300	6,650	3,075	29,650
August -	950	Nil.	5,900	3,200	1,000	3,000	1,500	3,200	60,850	12,175	79,600
September	5,625	2,950	121,520	46,100	18,000	20,200	2,605	20,915	86,600	64,900	324,515
October -	4,275	16,700	18,890	56,900	42,275	56,240	6,750	52,400	37,000	15,720	291,430
November-	500	4,500	Nil.	8,100	10,000	21,170	19,350	21,250	1,000		85,870
December -	2,300	300	600	2,800	3,265	900	17,162	7,975	500		35,802
	26,260	110,650	160,660	146,900	149,190	127,410	109,747	161,644	204,291		1,196,752

From this monthly Return we infer that there are two fruit Seasons within a year as follows:—

Spring.	*Autumn.*
February	August
March	September
April	October
	November.

It will be noticed that there are abnormal conditions within these seasons and that there is some floral and foliar activity resulting in minor fruit crops in other months of the year, and also that there is considerable variation both in the Spring and Autumn crops. The best crop month in Spring is March which over a period of nine years stands third in the annual returns, and varies from a nil return in 1905 and only 50 seeds in 1902 to 43,050 seeds in 1901. A similar variation may be observed in the Autumn crop for the month of August, which out of a total of 79,600 seeds for nine completed years produced no less than 60,850 seeds during that month for the year under review, *i.e.*, 1905. This may be explained as partly due to the change (and variability) of seasons or what corresponds to the change of seasons in temperate climates, and as we shall have occasion to refer to the effect of climatic conditions particularly as influenced by rainfall we append a summary of the Rainfall Returns for the Island of Singapore during the past nine years:—

Mean Annual Rainfall for Singapore Island
from 1897 to 1905.

Years.	*Inches.*
1897	101·58
1898	101·19
1899	108·60
1900	90·98
1901	83·56
1902	82·28
1903	103·95
1904	101·54
1905	83·40

If, therefore, 50,000 seeds or upwards for the Spring months of February, March and April, and 100,000 seeds or upwards for the Autumn months of August, September, October and November be regarded "good" and 100 inches or upwards wet as regards the annual rainfall, the following Return may be drawn up:—

Analysis showing Relative position of Spring and Autumn seed crops in wet and dry years for one decade.

Year.	*Spring.* Seed crop Seeds.	Remarks.	*Autumn.* Seed crop Seeds.	Remarks.	*Rainfall.* Remarks.
1897	Returns probably not complete.				
1898	73,200	Good	24,150	Poor	Wet
1899	7,250	Poor	146,310	Good	Wet
1900	24,500	Moderate	114,300	Good	Normal
1901	62,150	Good	71,275	Moderate	Dry
1902	4,100	Poor	100,610	Good	Dry
1903	52,110	Good	30,205	Poor	Wet
1904	29,750	Moderate	97,765	Moderate	Wet
1905	2,054	Poor	184,850	V. good	Dry
1906	20,710	Poor	*	Good	Wet

* Autumn crop for 1906 will reach not less than 100,000 seeds.

Excepting the years 1901, when the difference of seeds between the two Seasons was the least recorded, and 1904, when there was a moderate crop both in the Spring and Autumn, this analysis tends to prove that, while there are two seasons when flowers and fruits may occur in some years within the period of a year, there is never more than one heavy crop, and that the Autumn is the more uniform crop of the two, as the Spring has only exceeded the Autumn crop twice in ten years; and further that the Autumn fruit periodicity represents the true normal condition of the tree. There is, however, much variation as mentioned of the years 1901 and 1904 to a return of almost nil for the Spring crop of 1905, while the Autumn crop of the same year was the largest recorded. This abnormal variation is undoubtedly due to climatic conditions, as is shown by the comparison of an excessively wet or very dry year. It is very seldom that in the old trees of the Botanic Gardens any are seen to be completely defoliated and how often the reproductive functions of the tree are excited into activity can be judged by the return of the seeds procured at different periods (*see* page 441). It will be noticed that a month without any seed crop is rare but as might be expected with a climate so humid and with an equable rainfall the normal condition is but seldom obtained. In this respect the year of Report (1905) is the best example. During February and March only 300 seeds were collected and as these months represent the winter or dormant period it will be inferred. as did occur, there was a heavy leaf fall and a better than usual resting period so necessary for a heavy or exhaustive autumn crop which ripens about six months after the flowers appear. The direct effect of a heavy rainfall or the necessity of very little rain at the foliar periodicity is shown in the following tables:—

Rainfall.		*Fruit Crop.*	*1905.*	
1904: December	9·98	1905: August	60,050	Seeds
1905: January	5·28	September	86,600	do.
1905: February	5·79	October	37,000	do.
Total	21·05	Total	184,450	Seeds.

Rainfall.		*Fruit Crop.*	*1906.*	
1905: December	9·46	1906: August	12,175	Seeds
1906: January	16·87	September	64,900	do.
1906: February	5·80	October	15,720	do.
Total	32·13	Total	92,795	Seeds.

It must be remarked that the paucity of fruit crop is not the true expression of the effects of climatic conditions on all the functions of the trees and their variability or activity throughout the year, as the fruit crop may be marred at the time of pollination by the physical agency of heavy rain showers.

No better instance of rain damage could be cited than in the case of the durian (*Durio zibethinus*). In Malaya it is common knowledge that a heavy rain shower at the time of pollination seriously affects the prospective crop and continuous rain utterly destroys it. The durian, too, furnishes a good example of variability. Several years may pass with only one flowering period and occasionally, as during the current year, when a good crop was ripened last July and August, profuse flowers were produced the following September, nearly all of which in the vicinity of the Botanic Gardens were lost through heavy rains.

Hevea braziliensis is a monœcious tree, with male and female flowers on the same panicle or rather compound cyme. The male flowers are vastly more numerous than the female, which are borne singly on the subterminal branchlet of each cyme branch. The female flower opens first and remains attached to its pedicel. The perianth withers on the fertilized ovary and eventually is pushed off as the ovary grows. The male flowers are more numerous and open after the females on the same panicle are withered. They fall off completely from the pedicels after discharge of the pollen. The flowers are all yellow, and very strongly and sweetly scented.

It is not common, so far as we have seen, to find any fertilizing insect at work, the only ones seen being a common species of *Musca* with a dark green body and red head which has been seen in the evening licking honey from the petals. It is the same insect which plays the part of fertilizer of the oaks, *Kurrimia*, *Sindora* and other green flowered strongly scented trees. It has not been seen at the flowers of *Hevea* in such immense abundance as on the indigenous trees mentioned where the roar of their wings can be heard from the foot of the trees, and the ground in the vicinity is often thick with them. It is probably, however, the fertilizer of *Hevea*. The larva of the insect apparently feeds on dung, and heavy falls of rain, especially in a place so liable to floods as the spot under observation, may, perhaps, destroy it. We have also seen a brown pollen-eating fly, one of the *Syrphidæ*, at the flowers.

The heavy storms may affect the fruiting also by destroying the pollen but we are more inclined to think that they simply knock off the male flowers before the pollination of the female is effected. The result anyway is a poor fruit crop, but while a fruit crop may be heavy or light as a result of successful or imperfect fertilization it appears from the record of one decade that a large Spring crop is more in response to a previous poor Autumn one, or complete failure rather than a permanent or regularly defined foliar periodicity. At the same time it will be evident, if it is allowed that there is one time of the year better for tapping than another, that the returns of latex from the same trees or groups of trees would be of varying value and quantity according to the physiological state or phase of the tree at that time.

It is frequently contended that *Hevea braziliensis* in Malaya differs in certain characteristics from the tree in the Amazons, where it is indigenous and that it is here in a state of transition or modification. We do not, however, consider that there are any signs of this.

Reports from Brazil as to the flowering and fruiting seasons do not quite agree with what occurs here, but this is no doubt due to the difficulty of making accurate observations in mixed forests and also to the fact that at one season of the year the whole country is flooded, so that it must be impossible then to make satisfactory observations, particularly when it is remembered that Rubber trees in Brazil are estimated at an average of one to the acre.

In Mr. Consul TEMPLE'S account (quoted Bulletin I p. 2) it is stated that "The tree flowers in January, the seeds are ripe and begin to fall in March in the case of old trees and in May in the case of young trees." This, we know, is not substantially correct; March seeds would be the result of September flowers, and January and February flowers would produce seeds in August and September, at a time when, according to all observers, the country is flooded and thus this fruiting would escape observation. According to ULE, however (*Kautschuk-gewinnung und Kautschuk-handel in Amazonen-strome*), the flowering season is July and August, the driest months, and most of the fruits fall in January and February, the rainy season being from October to March.

The natural inference is that the behaviour of the tree in Brazil and Malaya is the same, only the tree conforms to the seasons obtaining in either country. The most pronounced dry season in Malaya is between January and March (which is the season of rice harvest) and corresponds with July and August in Brazil. It is evident, however, from Mr. Consul TEMPLE'S observations that *Hevea* trees flower in January and February and seeds would ripen and fall six months later, at a time when the country is flooded. But due allowance must be made for the more decided wet and dry seasons in Brazil, as compared with the more usual equable rainfall of Malaya.

Synopsis of the Experiments.

A synopsis of the work carried out is herewith furnished in six tables. These have been compiled from the records kept and are abbreviated into a concise form in order that the results may be seen without undue details.

The Tables show:—

1. Comparative results.
2. Annual increment of growth.
3. Methods of tapping.
4. Quantity of latex obtained and rubber won.
5. Average yield of rubber per tree.
6. Ratio of caoutchouc or rubber to that of latex.
7. Record of experiments from their first inception 1904 up to July, 1906.

Note.—(*a*) Each collecting cup contains ½ oz. c/c added water.
(*b*) The comparative yield of Rubber under varying conditions (and not the maximum yield under the most favourable conditions) has been attempted.

SYNOPSIS OF EXPERIMENT I.

Number of Trees Tapped.	Aggregate girth at 3 ft. from ground.		Period of Tapping.	Number of days Tapped.	Mode of Tapping.	Fluid ounces of latex obtained.	Dry Rubber obtained.				Total amount of dry Rubber obtained.		Comparative yield of dry Rubber per inch of girth at 3 ft. from ground.	Average girth per tree.		Dry Rubber average yield per tree per annum.		Ratio of fluid ounces to ounces of dry biscuit.
							Mornings.		Evenings.									
	Ft.	in.					lbs.	oz.	lbs.	oz.	lbs.	oz.		Ft.	in.	lbs.	oz.	
							1904.											
50	173	$8\frac{1}{2}$	July	15	Various	...	18	$4\frac{3}{4}$	18	$12\frac{1}{4}$	37	11	Over $\frac{1}{4}$ oz.	3	5			
							1905.											
50	182	$3\frac{1}{4}$	1st period Aug.-Sept.	25	Mornings Daily Herring-Bone	ozs. c/c 5,484	58	00			58	0	Under $\frac{1}{2}$ oz.					$5\frac{14}{16}$ ozs. c/c
			2nd period Nov.-Dec.	22	Evenings Daily Herring-Bone	ozs. c/c $2{,}402\frac{1}{2}$	29	00			29	0	Under $\frac{1}{4}$ oz.	3	$7\frac{1}{2}$			$5\frac{3}{16}$ ozs. c/c
							1906.											
50	191	$9\frac{7}{8}$	June-July	25	Mornings Daily Herring-Bone.	ozs. c/c 3,080	47	02			47	2				*2	11	$4\frac{1\frac{1}{2}}{16}$ ozs. c/c
									add scrap		11	$6\frac{1}{2}$						
									,, clot		4	$14\frac{1}{2}$						

* Exclusive of Scrap and Clot.

SYNOPSIS OF EXPERIMENT II.

Number of trees Tapped.	Aggregate girth at 3 ft. from ground.		Period of Tapping.	Number of days Tapped.	Mode of Tapping.	Fluid ounces of latex obtained.	Dry Rubber obtained.				Excluding scrap and clot. Total amount of dry Rubber obtained.		Comparative yield of dry Rubber per inch of girth at 3 ft. from ground.	Average girth per tree.		Dry Rubber Average yield per tree per annum.		Ratio of fluid ounces to ounces of dry biscuit Rubber.
							Mornings.		Evenings.									
	Ft.	in.				oz. c/c.	lbs.	oz.	lbs.	oz.	lbs.	oz.		Ft.	in.	lbs.	ozs.	
							1904.											
120	358	4¾	July-August	14-18	Various	...	54	3¾	49	5	103	8¾	Under ½ oz.	2	11¾			
							1905.											
120	366	4¾	1st period Sept.-Oct.	21	Herring-bone alternate days	10,736	144	00	...		144	00	Over ½ oz.	3	0⅝	† 1	11½	4⅝ ozs. c/c
	2nd period of Tapping		December	25	H. B. daily	7,372	*37	00	* 25	00	62	00	Under ¼ oz.					7½ ,,

* Mornings 70 trees = 4,502 ozs. % = 37 lbs.
Evenings 50 trees = 2,870 ozs. % = 25 lbs.
Total ... 7,372

† Exclusive of Scrap and Clot.

SYNOPSIS OF EXPERIMENT III.

Number of Trees Tapped.	Aggregate girth at 3 ft. from ground.	Period of Tapping.	Number of days Tapped.	Mode of Tapping.	Fluid ounces of latex obtained.	DRY RUBBER OBTAINED.		Total amount of dry Rubber obtained.	Comparative yield of dry Rubber per inch of girth at 3 ft. from ground.	Average girth per tree.	Dry Rubber average yield per tree per annum.	Ratio of fluid ounces to ounces of dry Rubber.
						Mornings.	Evenings.					
						lbs. ozs.	lbs. ozs.	lbs. ozs.		Ft. in.	lbs. ozs.	
	Ft. in.					1904.						
140	333 4¼	Aug.-Sept.	15-23	Various	...	40 5¼	37 10	77 15¼	Over ¼ oz.	2 4½		
						1905.						
140	343 1¼	1st period Sept.-Oct.	18	Herring-bone Alternate Days	6,597½	96 00	...	96 00	Over ¼ oz.	2 5¼		4¼ ozs. c/c
140	2nd period of Tapping	Dec.-Jan.	25	H. B. daily	6,039	* 14 00	* 29 00	43 00	Under ¼ oz.		† 1 00	9 ozs. c/c

* { Mornings 30 Trees.
Evenings 110 Trees.

† Exclusive of Scrap and Clot.

SYNOPSIS OF EXPERIMENT IV.

Number of Trees Tapped.	Aggregate girth at 3 ft. from ground.		Period of Tapping.	Number of days Tapped.	Mode of Tapping.	Fluid ounces of latex obtained. c/c.	Dry Rubber obtained.				Total amount of dry Rubber obtained. Excluding Scrap and Clot.		Comparative yield of dry Rubber per inch of girth at 3 ft. from ground.	Average girth per Tree.		Dry Rubber average yield per tree per annum.		Ratio of fluid ounces to ounces of dry Rubber.
							Mornings.		Evenings.									
	Ft.	in.					lbs.	ozs.	lbs.	ozs.	lbs.	ozs.		Ft.	in.	lbs.	ozs.	
							1904.											
200	631	10	Nov.-Dec.	18	H. B. Various	...	91	8½	71	13½	163	6	Over ¼ oz.	3	1¾			
							1905.											
200	648	5½	Oct.-Nov.	25	H. B. Daily	11,746½	199	00	...		199	00	Under ½ oz.	3	2¾			$3\frac{11}{16}$ oz. c/c
							1906.											
200	...		March-April	25	H. B. Single and Full, Daily	10,943	154	00	...		154	00				*1	12¼	$4\frac{7}{16}$ oz. c/c

* Exclusive of Scrap and Clot.

EXPERIMENT IV, 1905, DETAILED.

Herring-Bone Method, Daily, Mornings.

Date 1905.	Aggregate girth.	Groups of 20 Trees.									
		46 ft. 4½ in.	46 ft 1½ in.	48 ft. 0 in.	46 ft. 2 in.	67 ft. 4¼ in.	66 ft. 9¾ in.	76 ft. 9¾ in.	78 ft. 1½ in.	85 ft. 10 in.	86 ft. 10¼ in.
	Working Number.	1	2	3	4	5	6	7	8	9	10
Oct. 25	Fluid.	18	15	28	17	29	14	28	30	20	19
,, 26	ozs.	20	21	34½	35	39	17	29	39	36	40
,, 27	c/c.	25	35	47	43	54	30	32	42	61	66
,, 28	,,	23	34	49	51	67	26	32	48	76	86
,, 29	,,	41	37	53	44	74	38	38	53	80	82
,, 30	,,	26½	48	48	50	64	60	50	70	81	80
,, 31	,,	20	40	50	58	78	41	45	59	75	101
Nov. 1	,,	24	31	46	43	44	36	38	30	27	84
,, 2	,,	27	31	36	48	51	28	34	39	49	72
,, 3	,,	20½	30	28	46	34	26	24	40	37	45
,, 4	,,	24	29	29	45	40	27	18	32	48	64
,, 5	,,	20½	32	38	57	44	30	22	44	51	72
,, 6	,,	25	36	35	53	51	24	28	48	68	52
,, 7	,,	30	39	41	56	50	28	37	51	63	84
,, 8	,,	29	40	40	59	68	29	32	58	72	79
,, 9	,,	29	29	42	67	76	37	32	66½	81½	76
,, 10	,,	36	36	46	53	69	28	39	65	84	93½
,, 11	,,	32	37	38	52	68	31	36	56	84	90½
,, 12	,,	32	24½	43	60	64	32	26	57	79	84
,, 13	,,	29	44	45	61	74	30	38	58	80	96
,, 14	,,	36	41	45	66½	57½	30	40	52	88	99
,, 15	,,	20	36½	41	61	61½	30	40	69½	86	73
,, 16	,,	30½	32	42	66	65½	29	40½	62	78	99
,, 17	,,	34	37	40	71	64	28	40	51	71	71½
,, 18	,,	24	34½	42	49	78	28	36	56	66	81½
Total fluid ozs. …		675½	849½	1,026½	1,311½	1,464½	757	854½	1,276	1,641½	1,890

Total fluid ozs. 11,746½ = 199 lbs dry Rubber.

,, aggregate girth 648 ft. 5½ in.

EXPERIMENT IV, 1906, DETAILED.

Herring Bone Method, Single and Full, Mornings.

Date 1906.	Aggregate Girth Working Number.	Groups of 40 Trees.				
		Single.	Full.	Single.	Full.	Full.
		1	2	3	4	
Mar. 16	Fluid	22	20	32	44	42
,, 17	ozs. c/c	28	30	28	48	48
,, 18	,,	28	40	36	44	70
,, 19	,,	32	42	42	76	94
,, 20	,,	46	64	48	84	136
,, 21	,,	60	50	49	82	140
,, 22	,,	42	62	62	82	140
,, 23	,,	43	80	68	68	172
,, 24	,,	76	76	76	100	152
,, 25	,,	44	76	72	108	152
,, 26	,,	44	80	76	96	130
,, 27	,,	45	81	80	124	160
,, 28	,,	50	84	96	130	160
,, 29	,,	52	76	88	124	154
,, 30	,,	70	84	84	136	164
,, 31	,,	62	84	78	148	172
April 1	,,	56	90	96	142	160
,, 2	,,	66	81	92	158	152
,, 3	,,	60	84	84	163	164
,, 4	,,	54	80	96	150	144
,, 5	,,	48	76	106	151	134
,, 6	,,	44	79	106	153	148
,, 7	,,	46	58	80	132	125
,, 8	,,	54	62	74	138	142
,, 9	,,	44	64	74	135	130
Total fluid ozs.		1,216	1,703	1,823	2,816	3,385

Total fluid ozs. 10,943 ozs. c/c=154 lbs. dry biscuits.

EXPERIMENT IV 1905 and 1906 Compared.

1905.					1906.				
Group.	20 Trees. Aggregate girth.		Mode of Tapping.	Total Fluid.	GROUP.	40 Trees. Aggregate girth.		Mode of Tapping.	Total Fluid
	Ft.	Ins.		Ounces c/c.		Ft.	Ins.	Daily.	Ounces c/c.
1	46	4½	Herring Bone	675½		92	6	H. B. Single.	1,216
2	46	1½	Daily (Full).	849½					
3	48	0	Do.	1,026½		94	2	H. B. Full.	1,703
4	46	2	Do.	1,311½					
5	67	4¼	Do.	1,46 ½		134	2	H. B. Single.	1,823
6	66	9¾	Do.	757					
7	76	9¾	Do.	854½		154	11¼	H. B. Full.	2,816
8	78	1½	Do.	1,276					
9	85	10	Do.	1,641½		172	8¼	H. B. Full.	3,385
10	86	10¼	Do.	1,890					
Total.	648	5½		11,746½		648	5½		10,943

	1905.		1906.	
Group 1 & 2	1,525 ozs. c/c		1,216 ozs. c/c.	— 309 oz.
„ 3 & 4	2,338	„	1,703 „	— 635 „
„ 5 & 6	2,221½	„	1,823 „	— 398½ „
„ 7 & 8	2,130½	„	2,816 „	+ 685½ „
„ 9 & 10	3,531½	„	3,385 „	— 146½ „
Total ozs. c/c.	11,746½		10,943	

1905 ... ... 11,746½ ozs. c/c. @ $3\frac{11}{16}$ oz.=1 oz. dry Rubber avoirdupois.
1906 ... ... 10,943 „ $4\frac{7}{16}$ oz.=1 oz. do.

803½

SYNOPSIS OF EXPERIMENT V.

Number of trees Tapped.	Aggregate girth at 3 ft. from ground.		Period of Tapping.	Number of days tapped.	Mode of Tapping.	Fluid ounces of latex obtained ozs. c/c	Dry Rubber obtained. Mornings.		Dry Rubber obtained. Evenings.		Total amount of dry Rubber obtained excluding scrap and clot.		Comparative yield of dry Rubber per inch of girth at 3 ft. from ground.	Average girth per tree.		Dry Rubber average yield per tree per annum.		Ratio of fluid ounces to ounces of dry Rubber (avoirdupois.)
	Ft.	in.					lbs.	oz.	lbs.	oz.	lbs.	oz.		Ft.	in.	lbs.	ozs.	
							1904.											
200	608	0¾	Nov.-Dec.	15-24	H. B. alternate days.	...	109	10½	85	14	195	8½	Under ½ oz.	3	0½			
							1905.											
200	621	5¾	Oct.-Nov.	25	H. B. Daily, Full, Evenings.	11,216½	...		138	0	138	0	Over ¼ oz.	3	1¼			$5\frac{1}{16}$ ozs. c/c
							1906.											
200			May.	25	H. B. Daily, Full and Single, Mornings.	9,747	140	0¾			140	0¾	Over ¼ oz.			* 1	6¼	$4\frac{5\frac{1}{3}}{16}$ ozs. c/c

* Exclusive of Scrap and Clot.

EXPERIMENT V 1905 DETAILED.

Herring Bone Full, Daily, Evenings.

GROUPS OF 20 TREES.

1905.	Aggregate girth.	35 ft. 6¾ in.	45 ft. 11¾ in.	55 ft. 7¾ in.	76 ft. 6¾ in.	95 ft. 10 in.	37 ft. 0 in.	50 ft. 0¾ in.	55 ft. 2¼ in.	74 ft. 7¼ in.	95 ft. 0½ in.
Date.	Working Numbers.	H. B. Full 1	H. B. Full 2	H. B. Full 3	H. B. Full 4	H. B. Full 5	H. B. Full 6	H. B. Full 7	H. B. Full 8	H. B. Full 9	H. B. Full 10
Oct. 25	Fluid	18	15	28	17	29	14	28	30	24½	33
,, 26	ozs. c/c	20	21	34½	35	39	17	29	39	33	57
,, 27	,,	25	35	47	43	54	30	32	42	56	69
,, 28	,,	23	34	49	51	64	26	32	48	68	66
,, 29	,,	41	37	53	44	74	38	38	53	62	68
,, 30	,,	26½	48	48	50	64	60	50	70	50	40
,, 31	,,	20	40	50	58	78	41	45	59	61	78
Nov. 1	,,	24	31	46	43	44	36	38	30	38	77
,, 2	,,	27	31	36	48	51	28	34	39	31	71
,, 3	,,	20½	30	28	46	34	26	24	40	30	60
,, 4	,,	24	29	29	45	40	27	18	32	33	70
,, 5	,,	20½	32	38	57	44	30	22	44	46	61
,, 6	,,	25	36	35	53	51	24	28	48	50	68
,, 7	,,	30	39	41	56	50	28	37	51	56	67
,, 8	,,	29	40	40	59	68	29	32	58	54	73
,, 9	,,	29	29	42	67	76	37	32	66½	62	68
,, 10	,,	36	36	46	53	69	28	39	65	57	72
,, 11	,,	32	37	38	52	68	31	36	56	57	53
,, 12	,,	32	24½	43	60	64	32	26	57	70	81
,, 13	,,	29	44	45	61	74	30	38	58	69	83
,, 14	,,	36	41	45	66½	57½	30	40	52	70	82
,, 15	,,	20	36½	41	61	61½	30	40	69½	62½	76
,, 16	,,	30½	32	42	66	65½	29	40½	62	61½	60½
,, 17	,,	34	37	40	71	64	28	40	51	58½	74½
,, 18	,,	24	34½	42	49	78	28	36	56	65½	70½
Total fluid ozs. c/c		676	849½	1,026½	1,311½	1,461½	757	854½	1,276	1,325½	1,678½

Total fluid ozs. c/c 11,216½=138 lbs. dry Rubber.
Aggregate girth =621 ft. 5¾ in.

EXPERIMENT V 1906 DETAILED.

Herring Bone Full and Single Daily, Mornings.

GROUPS OF 40 TREES.

Date.	H. B. Full.	H. B Single.	H. B. Full.	H. B. Single.	H. B. Full.
1906.	1 c/c	2 c/c	3 c/c	4 c/c	5 c/c
May 7	30	24	18	30	64
,, 8	62	60	80	74	112
,, 9	40	36	54	34	120
,, 10	48	30	60	56	104
,, 11	64	34	70	62	125
,, 12	61	41	81	62	125
,, 13	61	29	76	62	130
,, 14	...	...	Rain.	...	...
,, 15	62	32	68	90	150
,, 16	52	38	80	88	155
,, 17	62	52	58	90	165
,, 18	63	36	81	82	152
,, 19	64	40	64	72	155
,, 20	60	35	76	80	160
,, 21	50	34	60	78	160
,, 22	66	40	72	80	171
,, 23	66	40	70	81	180
,, 24	60	40	80	94	166
,, 25	60	41	70	82	160
,, 26	64	40	80	88	170
,, 27	60	40	80	88	162
,, 28	56	40	72	84	156
,, 29	60	41	80	90	158
,, 30	60	44	80	92	152
,, 31	50	44	80	90	156
June 1	40	48	80	100	140
Total fluid ozs.	1,421	979	1,770	1,929	3,648

Working Number.	ABSTRACT EX. 5.				
	Fluid.	Dry Biscuit.		Scrap.	
	ozs.	lbs.	ozs.	lbs.	ozs.
1	1,421	10	13	4	3
2	979	10	10¾	4	2¼
3	1,770	24	12½	5	14
4	1,929	29	12½	5	00
5	3,648	64	00	10	4
Total...	9,747	140	0¾	29	7¼

Plus Clot or:—

	lbs.	ozs.
Biscuit ...	140	0¾
Scrap	29	7¼
Clot	24	9½
	194	1½

Clot=Latex which has coagulated in collecting cups.

EXPERIMENT V. 1905 AND 1906 Compared.

1905.					1906.		
Group.	Aggregate girth 20 trees.		Mode of Tapping.	Total fluid.	Group.	Mode of Tapping.	Total fluid.
	Ft.	Ins.		ozs. c/c.		40 Trees	ozs. c/c.
1	35	6¾	Herring-	676	I	H. B. Full	1,421
2	45	11¾	Bone,	849½	II	Daily,	979
3	55	7¾	Daily,	1,026½	III	Morning-	1,770
4	76	6¾	Evenings.	1,311½	IV	do	1,929
5	95	10	„	1,461½	V	do.	3,648
6	37	0	„	757	...	...	...
7	50	0¾	„	854½	...	...	...
8	55	2¼	„	1,276	...	...	...
9	74	7¼	„	1,325½	...	...	...
10	95	0½	„	1,678½	...	...	...
Grand Total,	621	5¾	...	11,216½	...	...	9,747

	1905.				1906.	
Group	I & 6	= 1,433	=	Group	I	1,421
„	2 & 7	= 1,704	=	„	II	979
„	3 & 8	= 2,302½	=	„	III	1,770
„	4 & 9	= 2,637	=	„	IV	1,929
„	5 & 10	= 3,140	=	„	V	3,648
Total		11,216½ ozs. c/c				9,747 ozs. c/c

1905 11,216½ ozs. c/c or $5\frac{1}{16}$ ozs. c/c = 1 oz. dry Rubber.
1906 9,747 ozs. c/c or $4\frac{5\frac{1}{2}}{16}$ ozs. c/c = 1 oz. dry Rubber.

SYNOPSIS OF EXPERIMENT VI.

Number of trees Tapped.	Aggregate girth at 3 ft. from ground.		Period of Tapping.	Number of days tapped.	Mode of Tapping.	Fluid ounces of latex obtained, ozs. c/c.	Dry Rubber obtained.				Total amount of dry Rubber obtained excluding scrap.		Comparative yield of dry Rubber per inch of girth at 3 ft. from ground.	Average girth per tree.		Ratio of fluid ounces to ounces avoirdupois of dry Rubber.
							Mornings.		Evenings.							
	Ft.	in.					lbs.	oz.	lbs.	oz.	lbs.	oz.		Ft.	in.	
							1904.									
150	665	$0\frac{1}{2}$	Dec.-January.	21 to 28	H. B. Daily.		110	$15\frac{1}{4}$	99	$2\frac{1}{2}$	210	$1\frac{3}{4}$	Under $\frac{1}{2}$ oz.	4	$5\frac{1}{2}$	...
							1905.									
150	673	$2\frac{1}{8}$	Nov., Dec. January.	28	H. B. alternate days	11,446	138	0	...		138	0	Over $\frac{1}{4}$ oz.	4	$5\frac{7}{8}$	$5\frac{3}{16}$ c/c
							1906.									
150	...		June-July.	25	H. B. Daily, mornings.	15,280	268	7	...		268	7		* lbs. 2	oz. 11	$3\frac{9}{16}$ c/c

* Exclusive of Scrap and Clot.

EXPERIMENT VI 1905, Detailed.

Herring Bone, Full, Alternate Days.

1905.	Aggregate girth.	GROUP OF 15 TREES.										
		58 Ft. 11 in.	56 Ft. 8⅞ in.	61 Ft. 10 in.	75 Ft. 11⅞ in.	87 Ft. 11⅜ in.	1905.	56 Ft. 8½ in.	56 Ft. 8⅞ in.	66 Ft. 4⅜ in.	73 Ft. 2⅛ in.	78 Ft. 9⅛ in.
Date.	Working Number.	1	2	3	4	5	Date.	1 ×	2 ×	3 ×	4 ×	5 ×
Nov. 26	Fluid.	12	8½	15	19½	16	Nov. 27	10½	22	26½	25	13
,, 29	ozs. c/c.	20	12½	36	36	38	,, 30	17	30½	30½	24	27
Dec. 1	,,	18	16	34½	31	38	Dec. 2	23	30½	37	44	42
,, 3	,,	17½	24	30	29	40	,, 5	28	41	29	44	31
,, 6	,,	17½	24	32½	43	36	,, 7	20	36	26½	44	33
,, 8	,,	19½	20	15	22	36	,, 9	22	30	20	40½	36
,, 10	,,	21	20	16½	42	36	,, 11	22	44	27	36	34
,, 12	,,	23	26½	22	44	44½	,, 13	22	41	26	44	30
,, 14	,,	30	24	28	40	36½	,, 15	32	43	28	41	40
,, 16	,,	27	27	34	45½	46	,, 17	32½	48	44	49	42
,, 18	,,	29½	24	41	46	44½	,, 19	26½	43	45	41	42
,, 20	,,	38	26½	45	37	44	,, 21	40	43	40	36½	42
,, 22	,,	28½	29	33	38½	44	,, 23	28	36½	34	33	34
,, 24	,,	38½	39	40	44	46	,, 25	39	43	45	47	46
,, 26	,,	38½	39	42	40	43	,, 27	42	43	45	40½	40
,, 28	,,	41	33	48	47½	46	,, 30	44	43½	48	45	38
,, 31	,,	41	32	44	43½	45	1906.					
1906.	,,						Jan. 1	41	40	48	43	46
Jan. 2	,,	41	28½	44	42	44	,, 3	42	30½	45	44	43
,, 4	,,	41	38½	48	45	49	,, 5	42	40½	46	51	48
,, 6	,,	40	32	50	52½	54	,, 7	45	39	58	52	51½
,, 8	,,	42	32	52	36½	50	,, 9	48	44	56	30	55
,, 10	,,	42	45	52	34½	58½	,, 11	40	54	51	38	50½
,, 12	,,	44	46½	57	31	59½	,, 14	44½	48	62	36	43½
,, 15	,,	46	49½	55	30	75	,, 16	45	48	78½	33	55
,, 17	,,	48½	48	60½	41	66	,, 18	50	48	68½	41	62½
,, 19	,,	54½	58	70	52	68	,, 20	54	58	76	62	56½
,, 21	,,	50½	58	69	56	75	,, 22	51	68½	78	55	56
,, 23	,,	42	72	78	61	67	,, 24	56	62	80½	62½	64
Total c/c.		952	933	1,192	1,136	1,345½		1,007	1,198½	1,299	1,182	1,201½

EXPERIMENT VI, 1906 Detailed.

Herring Bone, Full, Daily, Mornings.

1906.	GROUPS OF 30 TREES.				
Date.	1	2	3	4	5
ozs. c/c	ozs. c/c	ozs. c/c	ozs. c/c	ozs. c/c	ozs. c/c
June					
,, 11	45	54	...	20	20
,, 12	45	72	30	34	52
,, 13	72	106	60	63	80
,, 14	86	104	104	96	120
,, 15	100	120	108	120	130
,, 16	100	120	120	120	122
,, 17	90	124	120	118	130
,, 18	...	Heavy	Rain	...	...
,, 19	120	135	140	130	144
,, 20	118	120	130	130	130
,, 21	132	140	144	144	148
,, 22	136	146	146	140	140
,, 23	136	146	146	140	140
,, 24	140	164	140	148	160
,, 25	160	144	150	170	170
,, 26	148	130	104	160	132
,, 27	148	126	120	198	144
,, 28	136	140	108	212	120
,, 29	156	140	113	220	96
,, 30	140	116	112	195	120
July 1	160	105	120	182	108
,, 2	140	100	90	190	110
,, 3	130	88	108	165	104
,, 4	136	105	116	168	108
,, 5	112	90	96	136	108
,, 6	132	99	96	160	99
,, 7	...	...	113	...	...
Total c/c	3,018	2,934	2,834	3,559	2,935

ABSTRACT.

Groups.	Fluid.	Dry Biscuit.		Scrap.		Clot.	
	ozs. c/c	lbs.	oz.	lbs.	oz.	lbs.	oz.
1	3,018	51	12	5	8	2	8
2	2,934	46	12	5	4	4	4
3	2,834	54	13	3	12	4	0
4	3,559	66	2	4	8	4	0
5	2,935	49	0	4	4	7	0
Total	15,280	268	7	23	4	21	12

or

			lbs.	oz.
Biscuit	...	...	268	7
Scrap	...	...	23	4
Clot	...	...	21	12
			313	7

$3\frac{9}{16}$ ozs. c/c = 1 oz. advoirdupois.

EXPERIMENT VI, 1905 AND 1906 COMPARED.

1905.				1906.		
Group.	Aggregate girth, 15 trees.	Mode of Tapping.	Total fluid.	Group.	Mode of Tapping.	Total fluid.
	Ft. Ins.		ozs. c/c.			oz. c/c.
1	58 11	Herring-	952	30 Trees.		
2	56 8⅞	Bone,	933	1	Herring-	3,018
		Full,			Bone,	
3	61 10	alternate,	1,192	2	Full,	2,934
4	75 11⅛	Days.	1,136	3	Daily.	2,834
5	87 11⅜	do.	1,345½	4	...	3,559
1 ×	56 8½	do.	1,007	5	...	2,935
2 ×	56 8⅞	do.	1,198½	...	...	...
3 ×	66 4⅜	do.	1,299	...	...	...
4 ×	73 2⅛	do.	1,182	...	...	...
5 ×	78 9⅛	do.	1,201½	...	...	...
Grand Total	673 2⅛		11,446½	...	...	15,280 c/c.

1905.				1906.			
Group	1 & 1 ×	= 1,959 c/c	=	Group	2	= 3,018	c/c.
,,	2 & 2 ×	= 2,131½	=	,,	1	2,934	,,
,,	3 & 3 ×	= 2,491	=	,,	3	2,834	,,
,,	4 & 4 ×	2,318	=	,,	4	3,559	,,
,,	5 & 5 ×	2,547	=	,,	5	2,935	,,
		11,446½				15,280	

1905 = 11,446½ ozs. c/c or $5\frac{3}{16}$ ozs. c/c = 1 oz. dry Rubber.
1906 = 15,280 ozs. c/c or $3\frac{9}{16}$ ozs. c/c = 1 oz. dry Rubber.

The Experiments Reviewed

Notes.

Experiment I.

From August, 1905 to July, 1906 or a period of one year, three tappings have been carried out, making a total number of 72 days or incisions resulting in 134 lbs. 2 oz. of dry rubber or an average of nearly 2 lbs. 11 oz. per tree. If to this is added 30 % for scrap and clot (which may vary from 25 % to 40 %) the average per tree is about 3½ lbs. The tappings include one evening period and it may be noticed that the ratio of caoutchouc to latex for the second period or evening tappings is better than the first or morning tappings although the interval of rest was only 2½ months or slightly less. This result stands alone and indicates the necessity of experiments and observations over a long period.

Experiment II.

The interval of rest between the two periods of tappings was under 1½ months, the second comparing unfavourably with the first period and the evening poorer than. the morning. The result is striking as the ratio of cacutchouc to latex in the second period is very low partly due to evening tapping but as may be seen the difference is more marked in respect of cacutchouc than latex, and it would appear that had the time been reversed the best flow of latex would have been obtained by daily tapping instead of alternate days. The average yield per tree (with 30 % scrap, etc. added) is 2 lbs. 3¾ ozs. for two periods of tappings only, the second or last tappings being most probably marred by (*a*) insufficient interval of rest, (*b*) commencement of the wintering or dormant season of the trees.

Experiment III.

Exactly an interval of two months' rest, which further emphasises the necessity of a longer period and the advantage of morning over evening tapping. Considering that these are small trees the first tapping may be described as satisfactory, and the flow of latex at the second tapping, fair, but the return of caoutchouc is remarkably poor and the average per tree is reduced and only amounts to 1 lb. 5 ozs.

Experiment IV.

The variations of different groups is strikingly illustrated as shewn in the details of this experiment. The difference in yield of latex between the two periods is only 803 ozs. c/c and it is probable that had all the groups in the second period of tappings been full herring-bone incisions instead of single incisions the margin would have been much less, still the single incisions compare favourably with the full incisions, but the ratio of caoutchouc is a considerable drop although an improvement on previous figures no doubt due to the longer rest—the interval being four months, and the average gross yield per tree is 2 lbs. 4¾ ozs.

Experiment V.

A most interesting experiment confirming the necessity of an interval of rest of six months, and the advantage of morning over evening tappings as while the former represent the second period of tapping and the yield of latex less, the ratio of caoutchouc was greater, and it may be noticed that the morning tappings included 80 trees tapped by single incisions. The average yield per tree per annum including scrap was 1 lb. 13 ozs.

Experiment VI.

According to the synopsis of this experiment daily tappings shew a better result than alternate days. The poor return during November, December, 1905, and January, 1906, or first period of tapping within a year may be partly explained bv recalling that the heaviest fruit crop recorded terminated in December, the heavy fruit crop and tapping period being conterminous. The whole group of trees therefore, was uniformly dormant. Despite this fall-off the trees average 3½ lbs. gross.

Summary.

The great problem involved in the scientific cultivation of rubber trees is briefly how to obtain the largest amount of rubber at the cost of the least injury to the tree, and the least damage to the bark. This result depends mainly on three points, *viz*:—

(*a*) the use of the most suitable tapping knife or other implement for making the incisions

(*b*) the selection of the best season or seasons, and time for tapping

(*c*) and the system which allows of the most rapid wound recovery.

Tapping Implements.

The kind of instrument used has a direct bearing on the actual flow of latex. From observations of the effects of incisions made by various implements, we are convinced that the tree responds to *shock* and the implement capable of making the cleanest and quickest incision is the ideal one.

This we have found in an English pattern obtainable in Singapore, it is a modified farrier's blade adjusted by a screw in a sliding socket and can be fixed at different angles as desired. It is substantial and makes a grooved incision, thus forming an excellent channel and saving drip, and is equally good for all methods of tapping.

Nearly all other invented knives or tools have been experimented with at the Botanic Gardens, some have been found unhandy, others unsuited for coolie use, and some much too fragile.

Tapping Seasons.

The result for a period of one year with the garden trees are as follows:—

No. of Experiment.	Groups of Trees.	Average girth per Tree. Ft. In.	Period of Tapping. 1905.	Period of Tapping. 1906.	Ratio of Fluid ozs. to 1 oz. DryRubber advoirdupois.	No. of times tapped within one year.	REMARKS.
I	50	3 7	Aug.-Sept.		$5\frac{14}{16}$ c/c.	1st Period.	Mornings.
,,	,,		Nov.-Dec.		$5\frac{3}{16}$,,	2nd ,,	Evenings.
,,	,,			June-July.	$4\frac{1\frac{1}{2}}{16}$,,	3rd ,,	Mornings.
II	120	3 $0\frac{5}{8}$	Sept.-Oct.		$4\frac{5}{8}$,,	1st Period.	Mornings. 50 trees
,,	,,		Dec.		$7\frac{1}{2}$,,	2nd ,,	Evenings.
III	140	2 $5\frac{1}{4}$	Sept.-Oct.		$4\frac{1}{4}$,,	1st Period.	Mornings.
,,	,,		Dec.	Jan.	9 ,,	2nd ,,	Evenings.
IV	200	3 $2\frac{3}{4}$	Oct.-Nov.		$3\frac{11}{16}$,,	1st Period.	Mornings.
,,	,,			Mar.-Apl.	$4\frac{7}{16}$,,	2nd ,,	Mornings.
V	200	3 $1\frac{1}{4}$	Oct.-Nov.		$5\frac{1}{16}$,,	1st Period.	Evenings.
,,	,,			May.	$4\frac{5\frac{1}{2}}{16}$,,	2nd ,,	Mornings.
VI	150	4 $5\frac{7}{8}$	Nov., Dec., Jan.		$5\frac{3}{16}$,,	1st Period.	Mornings.
,,	,,	,,		June-July.	$3\frac{9}{16}$,,	2nd ,,	Mornings.

This return clearly shews that morning are better than evening tappings, that trees can be tapped twice within the period of a year but the interval of rest should not be less than five months, that the dormant months December, January and February yield a smaller percentage of caoutchouc, and that the best season for tapping is from April to November. Turning to methods of tapping we have not found any advantage in respect of yield by the spiral over the herring-bone and considering the small advantage of the double over the single incisions we think the single cut with small trees would best economise the bark.

Wound Recovery.

In the case of a tree which had never been tapped, or in which an interval of several years had elapsed between the different tappings, the yield of rubber would, we have reason to believe, be the maximum in whatever month or season the tree was tapped but subsequent tappings would be modified by the interval of rest and by the physiological phase of the tree at the time of tapping.

Latex is very soon renewed after a period of tapping, but the production of rubber (caoutchouc) is a very much slower one. Thus in a trial of the spiral method of tapping on the largest tree in the Garden (girth at 3 ft. from ground 9′ 4″) we obtained from the first period tapping 531 fluid ozs. of latex * giving 9 lbs. of rubber and from the second period of tapping one month afterwards 433 ozs. of latex giving only 4 lbs. 15 ozs. of rubber (*See* Spiral Tapping) the ratios of caoutchouc to latex comparing as $3\frac{11}{16}$ fluid ounces to one ounce dry rubber, as against $5\frac{7}{16}$ fluid ozs. to the same amount of rubber. It is therefore of the greatest importance to the cultivator in tapping to avoid tapping at the wrong season when he is very liable to interfere with the special physiological processes in the tree then performing their functions. The periods of these processes cannot be controlled or modified, the cultivator will therefore have to adapt his work so as not to clash with them. The bark of the tree does not recover as well from wounds during the resting period between December and March, nor does it appear that the return of caoutchouc is as good. Further experiments we hope to carry out next year on this most important subject which will probably furnish the key to the whole of the rationale of the rubber industry. Rapid and good renewal of the bark is very necessary not only to protect the wound from injurious attacks of fungi but to increase the production of caoutchouc. Too frequent or prolonged tapping is not only injurious but produces a latex very inferior in its rubber-producing qualities. This can only be due to actual bark injury. The experiments made on an old stump in the Botanic Gardens seem to show this and to throw some light on the origin of rubber in the plant. A figure of this stump is given herewith. It was a tree of considerable size, measuring 40 inches in girth at three feet from the ground when the top was broken off accidentally some ten years ago. It then commenced to die from the top and till a few years ago produced at intervals shoots bearing a few leaves, the remains of the last of which can be seen just above the Polyporus fructification growing on the decaying wood. It had by this year died down to within two feet of the ground and was tapped by single incisions at the base, from which were obtained $3\frac{1}{2}$ oz. of dry, and very strong rubber. The bark was renewed in a few months, and was again found to contain rubber. It is long since there have been any leaves on the tree and it is clear that only the bark and roots have played any part in the renewal of the latex in the stump.

The experiments made this year show that although in over-tapping latex is renewed in the bark quickly, caoutchouc takes much longer to produce, though it does not seem in the worst cases ever to be entirely absent from the latex. The caoutchouc seems undoubtedly to be directly or indirectly produced from the roots, but as the only injury to the tree in tapping is caused to the bark of the trunk it seems clear that it is the bark injury only which reduces the amount of caoutchouc in the latex for it does not seem probable that the roots can be affected by the bark injury.

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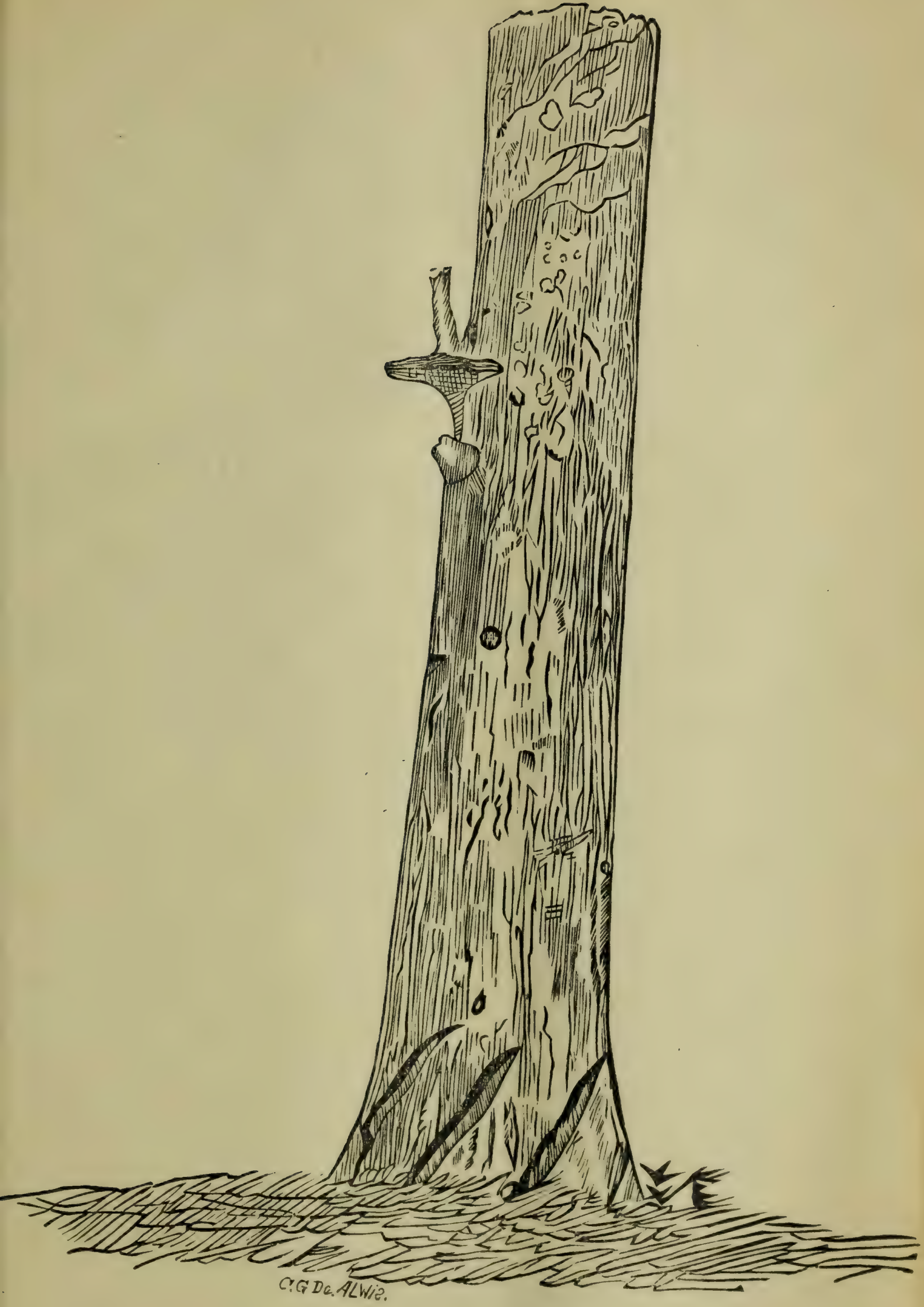
* Including the same quantity of added water at each period.



Height 6′ 10″. Girth at 3 ft. from ground 3′ 4″.
Scale 1″=1′.

Para Rubber-stump. Botanic Gardens, Singapore.

It cannot be too strongly pointed out that too frequent or prolonged tapping is injurious and only produces *inferior rubber.* Even so recently as the Ceylon exhibition the discussions shew that planters were quite satisfied with prospective rubber crops as judged by the copious flow of latex, not appreciating the fact that it is the *quality or ratio of caoutchouc to latex that alone constitutes the real crop and rich harvest.* It will be remembered that in Brazil, Rubber trees are only tapped for one period of the year; doubtless owing to the country being flooded. The longer interval of rest may represent well matured or well oxidised caoutchouc and partly explain the preference for Brazilian Rubber.

Spiral Method of Tapping.

This is a Ceylon invention now well known and a description of the method is not needed. From the stand-point of economy of bark and its renewal this method would appear to possess an advantage particularly from the use of the pricking implement. It is a slow method and as far as we know the gross yield of rubber or flow of latex is not increased. We should like more data for comparison with the herring-bone and this we expect to obtain by the time of the next annual report.

The method was alleged to be one by which tappings could be carried out every alternate month and the failure in practice has proved the theory wrong. How far that theory would be wrong by any method we have endeavoured to explain and the following result of three periods of tappings speaks for itself :—

Spiral Method on One large Tree 1906.

First Period 1906. Date.	Knife or Pricker.	Fluid ozs. c/c.	Second Period 1906. Date.	Knife or Pricker.	Fluid. ozs. c/c.	Third Period 1906. Date.	Fluid ozs. c/c.
Jan. 22	P.	17½	Mar. 23	K.	6	May 20	0
,, 23	K.	10	,, 24	P.	6	,, 21	3
,, 24	P.	20½	,, 25	K.	6	,, 22	1
,, 25	K.	8	,, 26	P.	6	,, 23	2
,, 26	P.	10	,, 27	K.	7	,, 24	1½
,, 27	K.	6	,, 28	P.	10½	,, 25	2
,, 28	P.	14	,, 29	K.	11	,, 26	2
,, 29	K.	8	,, 30	P.	12	,, 27	2
,, 30	P.	14	,, 31	K.	13	,, 28	2
,, 31	K.	12	April 1	P.	12	,, 29	5
Feb. 1	P.	16	,, 2	K.	18	,, 30	6
,, 2	K.	16	,, 3	P.	19	,, 31	6
,, 3	P.	14	,, 4	K.	15	June. 1	2
,, 4	K.	14	,, 5	P.	20		
,, 5	P.	18	,, 6	K.	18		
,, 6	K.	22	,, 7	P.	22		
,, 7	P.	20	,, 8	K.	17		
,, 8	K.	28	,, 9	P.	20		
,, 9	P.	20	,, 10	K.	20		
,, 10	K.	29	,, 11	P.	20		
,, 11	P.	20	,, 12	K.	20		
,, 12	K.	29	,, 13	P.	20		
,, 13	P.	18	,, 14	K.	20		
,, 14	K.	28	,, 15	P.	20		
,, 15	P.	22	,, 16	K.	20		
,, 16	K.	24	,, 17	P.	10		
,, 17	P.	17	,, 18	K.	10		
,, 18	K.	12	,, 19	P.	10		
,, 19	P.	18	,, 20	K.	15		
,, 20	K.	14	,, 21	P.	10		
,, 21	P.	12					
Total c/c		531			433½		34½

ABSTRACT.

	Fluid ozs. c/c.	Dry Biscuit.	
		lbs.	ozs.
1st Period	531	9	...
2nd ,,	433½	4	15
3rd ,,	34½		8½

1st Period $3\frac{11}{16}$ oz. c/c = 1 oz. dry
2nd ,, $5\frac{7}{16}$,, = 1 ,,

Note.—There was not any clot in the latex.

Increment of Growth.

In the first annual report attention was called to the poor growth of the Garden trees as a result of being overcrowded in a somewhat unfavourable spot. The actual increment of 860 trees is as follows:—

Groups of Trees.	Average girth 1904.	Average girth 1905.	Average increment per tree.
50	3′5″	3′7½″	2½″
120	2′11¾″	3′0⅝″	¾″
140	2′4½″	2′5¼″	¾″
200	3′1¾″	3′2¾″	1″
200	3′0½″	3′1¼″	¾″
150	4′5½″	4′5⅞″	⅜″

In another part of the Garden is a single line of Para trees with more root space and the increment of growth for 74 of these trees compares with the preceding groups very differently that is :—

Increment of Growth.

Registered No. of Tree.	1904. Measurement at 3 ft. from ground.		1905. Measurement at 3 ft. from ground.		1906. Measurement at 3 ft. from ground.		1905. Increment.	1906. Increment.	REMARKS.
	Ft.	In.	Ft.	In.	Ft.	In.	Inches.	Inches.	
1212	4	$2\frac{1}{8}$	4	$6\frac{1}{8}$	4	$8\frac{3}{8}$	4	$2\frac{1}{4}$	
1213	2	10	2	$11\frac{1}{2}$	3	$3\frac{1}{8}$	$1\frac{1}{2}$	$3\frac{5}{8}$	
1214	3	$0\frac{7}{8}$	3	$4\frac{3}{4}$	3	9	$3\frac{7}{8}$	$4\frac{1}{4}$	
1215	4	$2\frac{1}{2}$	4	4	4	7	$1\frac{1}{2}$	3	
1216	3	6	3	$9\frac{1}{4}$	3	$10\frac{3}{8}$	$3\frac{1}{4}$	$1\frac{1}{8}$	
1217	2	$4\frac{1}{8}$	2	$10\frac{1}{8}$	3	$3\frac{3}{8}$	6	$5\frac{1}{4}$	
1218	1	$5\frac{7}{8}$	1	10	2	$1\frac{1}{4}$	$4\frac{1}{8}$	$3\frac{1}{4}$	
1219	1	$7\frac{1}{2}$	2	2	2	$8\frac{1}{8}$	$6\frac{1}{2}$	$6\frac{1}{8}$	
1220	1	9	2	$1\frac{7}{8}$	2	$7\frac{1}{4}$	$4\frac{7}{8}$	$5\frac{3}{8}$	
1221	2	$10\frac{5}{8}$	3	$3\frac{3}{8}$	3	$8\frac{1}{8}$	$4\frac{3}{4}$	$4\frac{3}{4}$	
1222	1	$5\frac{5}{8}$	1	$9\frac{1}{2}$	2	$1\frac{7}{8}$	$3\frac{7}{8}$	$4\frac{3}{8}$	
1223	1	$11\frac{1}{8}$	2	$3\frac{1}{4}$	2	$8\frac{5}{8}$	$4\frac{1}{8}$	$5\frac{3}{8}$	
1224	1	$6\frac{5}{8}$	1	$11\frac{1}{2}$	2	$3\frac{7}{8}$	$4\frac{7}{8}$	$4\frac{3}{8}$	
1225	1	$9\frac{3}{4}$	2	$3\frac{1}{4}$	2	$8\frac{3}{8}$	$5\frac{1}{2}$	$5\frac{1}{8}$	Forked at base—3 stems.
,,	1	$4\frac{5}{8}$	1	$8\frac{1}{4}$	2	0	$3\frac{5}{8}$	$3\frac{3}{4}$	
,,	1	$7\frac{1}{8}$	2	0	2	$4\frac{1}{2}$	$4\frac{7}{8}$	$4\frac{1}{2}$	
1226	1	$11\frac{7}{8}$	2	$4\frac{3}{8}$	2	$10\frac{1}{8}$	$4\frac{1}{2}$	$5\frac{3}{4}$	
1227	1	$9\frac{7}{8}$	2	$2\frac{3}{8}$	2	$6\frac{3}{4}$	$4\frac{1}{2}$	$4\frac{3}{8}$	
1228	2	7	3	$2\frac{1}{2}$	3	$9\frac{5}{8}$	$7\frac{1}{2}$	$7\frac{1}{8}$	
1229	2	1	2	$4\frac{5}{8}$	2	$7\frac{1}{2}$	$3\frac{5}{8}$	$2\frac{7}{8}$	
1230	1	$8\frac{3}{8}$	2	$0\frac{3}{4}$	2	$4\frac{3}{8}$	$4\frac{3}{8}$	$3\frac{5}{8}$	
1231	2	$1\frac{1}{4}$	2	$4\frac{3}{4}$	2	$5\frac{5}{8}$	$3\frac{1}{2}$	$\frac{7}{8}$	
1232	1	$2\frac{7}{8}$	1	$6\frac{3}{8}$	1	$10\frac{1}{8}$	$3\frac{1}{2}$	$3\frac{3}{4}$	
1233	2	$2\frac{1}{2}$	2	$9\frac{1}{2}$	3	$3\frac{5}{8}$	7	$6\frac{1}{8}$	
1234	1	$10\frac{3}{4}$	2	$2\frac{5}{8}$	2	$6\frac{5}{8}$	$3\frac{7}{8}$	4	
1235	1	$10\frac{1}{2}$	2	$3\frac{1}{8}$	2	$7\frac{3}{8}$	$4\frac{5}{8}$	$4\frac{1}{4}$	
1236	2	$5\frac{1}{8}$	2	$7\frac{3}{4}$	2	11	$2\frac{5}{8}$	$3\frac{1}{4}$	
1237	1	5	1	$6\frac{7}{8}$	1	$10\frac{7}{8}$	$1\frac{7}{8}$	4	
1238	1	$9\frac{5}{8}$	2	2	2	6	$4\frac{3}{8}$	4	
1239	1	$8\frac{1}{4}$	2	$0\frac{1}{2}$	2	5	$4\frac{1}{4}$	$4\frac{1}{2}$	
1240	1	8	1	$10\frac{3}{4}$	2	$2\frac{3}{4}$	$2\frac{3}{4}$	4	
1241	1	4	1	$6\frac{1}{2}$	1	$11\frac{7}{8}$	$2\frac{1}{2}$	$5\frac{3}{8}$	
1242	1	5	1	$7\frac{7}{8}$	1	$10\frac{7}{8}$	$2\frac{7}{8}$	3	
1243	1	$5\frac{5}{8}$	1	$8\frac{3}{8}$	1	$10\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{1}{8}$	
1244	1	11	2	1	2	$4\frac{1}{2}$	2	$3\frac{1}{2}$	
1245	1	$6\frac{1}{2}$	1	10	2	$0\frac{5}{8}$	$3\frac{1}{2}$	$2\frac{5}{8}$	
1246	1	$6\frac{1}{4}$	1	$7\frac{5}{8}$	1	$8\frac{7}{8}$	$1\frac{3}{8}$	$1\frac{1}{4}$	
1247	1	$10\frac{1}{4}$	2	$1\frac{1}{4}$	2	$5\frac{1}{4}$	3	4	
1248	1	$2\frac{1}{4}$	1	$5\frac{3}{8}$	1	$8\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{1}{8}$	

Increment of Growth.

Registered No. of Tree.	1904. Measurement at 3 ft. from ground.		1905. Measurement at 3 ft. from ground.		1906. Measurement at 3 ft. from ground.		1905. Increment.	1906. Increment.	REMARKS
	Ft.	in.	Ft.	in.	Ft.	in.	Inches.	Inches.	
1249	1	4	1	7⅞	1	11⅜	3⅞	3½	
1250	1	7⅛	1	11	2	3	3⅞	4	
1251	1	7	1	9¾	2	1⅜	2¾	3⅝	
1252	1	7⅛	1	11⅛	2	1⅞	4	2¾	
1253	1	8¼	1	11⅛	2	1½	2⅞	2⅜	
1254	1	9	2	1	2	6⅜	4	5⅜	
1255	2	2⅞	2	5⅝	2	7⅜	2¾	1¾	
1256	3	9⅞	4	0	4	3¼	2⅛	3¼	
1257	2	6	2	9⅝	3	1½	3⅝	3⅞	Trees in groups.
1258	2	6¾	2	9¾	3	1¾	3	4	do.
1259	2	7	2	11⅝	3	4⅝	4⅝	5	do.
1260	2	4⅝	2	4⅝	2	4⅝	nil	nil	do.
1261	2	8¾	3	1	3	6⅜	4¼	5⅜	do.
1263	3	9⅛	4	0½	4	6	3⅜	5½	do.
1265	2	11¼	3	3⅝	3	6⅝	4⅜	3	do.
1266	2	0¾	2	3⅛	2	6¼	2⅜	3⅛	do.
1267	1	9⅜	1	11	2	1⅛	1⅝	2⅛	do.
1268	1	5	1	7¼	1	9½	2¼	2¼	do.
1269	1	5	1	6⅝	1	8⅝	1⅝	2	do.
1270	1	7½	1	9⅜	1	11	1⅞	1⅝	do.
1271	1	11½	2	2⅛	2	5⅛	2⅝	3	do.
1272	3	2½	3	4½	3	6⅝	2	2⅛	do.
1273	2	7	2	8	2	10¾	1	2¾	do.
1274	1	8¼	1	9½	1	10	1¼	½	do.
1275	2	0	2	0½	2	2	½	1½	do.
1276	4	5¾	4	9⅞	4	10	4⅛	⅛	do.
1277	5	0½	5	2⅞	5	5⅜	2⅜	2½	do.
1278	2	10	2	11	2	11⅝	1	⅝	do.
1279	2	10¼	3	0½	3	2	2¼	1½	do.
1280	2	9½	3	0⅞	3	5⅜	3⅜	4½	do.
1281	5	2⅜	5	8⅛	5	11⅜	5¾	3¼	do.
1282	1	10¼	1	10¾	2	0	½	1¼	do.
1283	2	8⅞	3	0⅞	3	2	4	1⅛	do.
1284	4	0⅞	4	6⅞	4	10⅝	6	3¾	do.
1285	3	8¼	4	0½	4	1¾	4¼	1¼	do.

The flow of latex irrespective of age increases with the size of the tree and the best test of cultivation is a satisfactory increment of growth, which should average not less than three inches per annum from trees of twelve inches in girth to the fully developed tree. To obtain such increment it is a matter of the first importance that the trees are placed sufficiently wide apart so that the roots do not intermingle while the trees are small, as when once this takes place their growth is impeded. The increment of growth is more governed by moisture or humidity than richness of soils and trees not closer than 20 feet apart with suitable intervening catch-crops for the early years must of necessity represent the best final result for the reason that without a fair average increment of growth, bark development is too slow and the bark becomes hard and the tree hide-bound and the mauufacture and separation of globules of caoutchouc from the latex is only partial.

In the possibility too of fungoid diseases catch-crops are no mean safe-guard. The idea of planting the trees too closely at first, to be thinned out later is a very dangerous one, as was pointed out in our first report.

CONCLUSION.

Of pests and diseases there is nothing special to report. The fungoid disease *Fomes semitostus* although not eradicated has not encroached. A plague of slugs has been disposed of by planting various catch-crops among the young trees.

In drying rubber the highest market prices have been obtained although we have had to work without the aid of machinery. On this subject we shall be in a better position to comment by the time of next report when the most suitable *smoke* for drying has been obtained by further investigation. The work carried out for the period under review has been pioneer work and we have endeavoured to shew by comparison through experiments the actual facts which occur and when all the variations of the tree have been reduced to order the physiological explanations will no doubt follow.

H. N. RIDLEY,
R. DERRY.

RAINFALL 1905.

1905. Date.	January.		February.		March.		April.		May.		June.	
	In.	parts.	In.	parts	In.	parts.	In.	parts.	In.	parts.	In.	parts.
1	...	24	...	...	...	60	...	...	...	...	...	...
2	2	00	...	...	...	...	...	...	2	30	...	...
3	...	24	...	...	...	...	...	...	...	70	...	...
4	...	08	...	...	...	...	...	26	...	...	...	...
5	...	...	...	...	...	...	...	22	1	25	...	...
6	...	...	...	...	...	05	1	73	...	...	...	...
7	...	...	...	...	...	...	...	10	...	...	...	...
8	...	12	...	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	25	...	...	...	...
10	...	...	...	...	...	...	3	00	...	...	...	...
11	...	...	1	00	...	...	...	22	...	...	...	...
12	1	70	...	12	...	...	...	...	...	...	1	75
13	...	58	...	50	...	...	...	...	...	80	...	75
14	...	...	...	30	...	16	...	...	...	75	...	50
15	...	...	2	00	...	...	...	...	...	...	...	...
16	...	...	1	15	...	...	...	...	...	50	...	...
17	...	...	...	65	...	...	...	...	...	20	...	30
18	...	...	...	...	...	46	...	...	...	30	...	...
19	...	18	...	...	...	...	...	...	...	45	...	...
20	...	14	...	...	...	26	...	...	...	...	...	...
21	...	...	...	...	...	54	...	...	1	20	...	...
22	...	...	...	...	...	...	...	...	1	65	...	20
23	...	...	...	...	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...	...	85	...	...
25	...	...	...	...	...	46	...	...	...	..	...	...
26	...	...	...	...	...	22	...	...	...	...	...	...
27	...	...	...	...	1	05	...	65	...	...	...	...
28	...	...	...	07	...	...	...	95	...	...	...	...
29	...	...	...	...	...	...	1	07	...	...	...	...
30	...	...	...	...	...	16	...	68	...	...	...	15
31	...	...	...	...	...	23	...	...	...	...	...	...
Total	5	28	5	79	4	19	9	13	10	95	3	65

RAINFALL 1905.

July.		August.		September.		October.		November.		December.	
In.	parts.	In.	parts.	In.	parts.	In.	parts.	In.	parts.	In.	parts.
I	30	...	...	...	...	...	...	...	...	...	...
...	...	...	60	...	...	...	55	...	...	...	...
...	...	2	50	...	...	...	03	...	...	2	55
...	...	...	...	...	...	...	45	...	...	...	85
...	...	...	20	...	02	...	...	...	...	...	31
I	00	...	...	...	08	...	...	...	...	...	04
...	...	...	...	...	05	...	...	...	...	...	12
...	...	...	...	...	05	...	...	...	60	...	...
...	...	...	...	...	02	...	...	...	77	...	25
...	...	...	...	...	35	...	...	...	26	...	40
...	...	...	...	...	...	2	70	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
...	30	...	28	...	...	...	...	...	...	...	45
...	...	...	40	...	...	...	...	...	...	...	15
...	...	...	...	...	55	...	...	...	70	...	20
...	...	...	...	...	...	I	10	...	...	...	...
...	...	...	...	...	...	...	38	I	00	...	...
...	...	...	...	...	...	...	...	...	13	...	...
...	...	...	...	..	66	...	...	...	54	...	11
I	15	...	...	...	...	...	...	I	13	...	12
...	75	...	...	...	...	...	11	...	40	...	...
...	...	...	...	...	...	...	...	...	10	...	...
I	30	...	...	...	...	...	...	...	20	I	10
...	...	...	...	....	...	...	...	...	11	2	00
2	65	...	...	...	05	...	...	I	10	...	...
...	...	...	...	...	...	...	10	...	30	...	11
...	...	...	...	...	07	...	...	I	55	...	20
...	...	...	...	...	...	...	...	...	03	...	...
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	67	...	...
...	...	...	...	...	...	...	...	...	...	...	50
8	45	3	98	I	90	5	42	9	59	9	46

METEOROLOGICAL OBSERVATIONS.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the Month of November, 1906.

Date.	Temperature of Radiation.										Wind. Direction.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Clouds and weather Initials.			Rain.
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference sun and shade.	Grass.	Difference shade and radiation.	9 H	15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	Inches.
	°	°	°	°	°	°	°	°	°	°			°	°	°	in.	in.	in.	°	°	°							
1	80	81	80·5	81	72	9	143	62	69	3	E.	S.E.	73·3	76	74·6	0·820	0·897	0·858	80	85	82·5	0	0	0	B	B	B	
2	81	83	82	85	72	13	140	55	70	2	S.E.	S.E.	74	74·7	74·3	·849	·856	·852	80	76	78	0	0	0	B	B	B	
3	79	87	83	88	72	16	141	53	69	3	E.	N.E.	77·3	72·2	74·2	·937	·792	·864	95	61	78	0	0	0	B	B	B	
4	81	86	83·5	88	74	14	147	59	69	5	S.E.	S.E.	76	74	75	·897	·855	·876	85	68	76·5	0	0	0	B	B	B	
5	82	89	85·5	91	73	18	149	58	70	3	S.E.	E.	75·3	74·3	74·8	·877	·847	·862	80	61	70·5	0	0	0	B	B	B	
6	81	86	83·5	87	72	15	129	42	69	3	E.	E.	74	74	74	·849	·855	·852	80	68	74	0	3	0	B	C	B	
7	80	83	81·5	84	72	12	141	57	69	3	S.E.	S.E.	73·3	74·7	74	·820	·856	·838	80	76	78	0	3	5	B	C	C	
8	79	81	80	82	72	10	126	44	69	3	S.E.	S.E.	77·3	76	76·6	·937	·897	·917	95	85	90	5	10	5	C	R	C	·23
9	77	79	78	80	72	8	139	59	68	4	S.E.	S.	75·3	77·3	76·3	·877	·937	·907	94	95	94·5	3	5	5	C	C	C	·10
10	76	80	78	81	73	8	130	49	70	3	S.E.	E.	74·3	75	74·6	·848	·867	·857	94	85	89·5	10	5	5	R	C	C	·05
11	78	79	78·5	80	73	7	139	59	70	3	E.	E.	74·6	77·3	75·9	·857	·937	·897	89	95	92	2	3	5	B	C	C	·20
12	79	87	83	88	73	15	140	52	70	3	E.	E.	77·3	72·2	74·7	·937	·792	·864	95	61	78	3	5	5	C	C	C	·25
13	82	86	84	89	73	16	145	56	70	3	S.E.	S.E.	75·3	82·7	79	·877	1·121	·999	80	90	85	10	5	5	R	C	C	
14	79	81	80	82	72	10	129	47	69	3	E.	E.	77·3	79·3	78·3	·937	1·000	·968	95	95	95	3	5	5	C	C	C	
15	80	81	80·5	82	71	11	146	64	68	3	S.E.	S.E.	75	77	76	·867	·947	·907	85	90	87·5	2	0	0	B	B	B	
16	84	87	85·5	89	72	17	140	51	69	3	S.E.	S.E.	74	83·7	78·8	·840	1·158	·999	72	90	81	0	0	0	B	B	B	
17	81	83	82	85	72	13	139	54	69	3	E.	E.	74	74·7	74·3	·849	·856	·852	80	76	78	0	10	3	B	R	C	1·12
18	83	88	85·5	89	72	17	144	55	70	2	E.	E.	74·7	76·5	75·6	·856	·913	.889	76	69	72·5	0	5	10	B	C	R	·90
19	80	84	82	85	72	13	130	45	70	2	E.	E.	75	74	74·5	·867	·840	·853	85	72	78·5	3	10	5	C	R	C	
20	84	87	85·5	88	73	15	147	59	68	5	S.E.	S.E.	74	83·7	78·8	·840	1·158	·999	72	90	81	0	0	0	B	B	B	
21	83	88	85·5	89	71	18	149	60	69	2	S.E.	S.E.	76·6	76·5	76·5	·916	·913	·914	90	69	79·5	0	0	2	B	B	B	
22	82	89	85·5	91	72	19	144	53	68	4	S.E.	S.E.	75·3	74·3	74·8	·877	·847	·862	80	61	70·5	0	0	10	B	B	R	
23	79	81	80	82	72	10	130	48	69	3	S.E.	S.E.	77·3	76	76·6	·937	·897	·917	95	85	90	3	3	0	C	C	B	
24	78	79	78·5	80	72	8	118	38	70	2	S.E.	S.E.	74·6	77·3	75·9	·857	·937	·897	89	95	92	3	5	2	C	C	B	·05
25	78	84	81	86	71	15	142	56	68	3	S.E.	S.E.	74·6	74	74·3	·857	·840	·848	89	72	80·5	0	0	3	B	B	C	
26	79	81	80	82	71	11	140	58	68	3	S.E.	S.E.	77·3	79	78·1	·937	1·000	·968	95	95	95	3	10	5	C	R	C	·06
27	80	84	82	89	72	17	145	56	69	3	S.E.	S.E.	74	75·7	74·8	·840	·888	·846	72	76	74	0	0	2	B	B	B	
28	80	82	81	83	72	11	145	62	70	2	S.E.	E.	76·6	75·3	75·9	·916	·877	·896	90	80	85	0	3	5	B	C	C	·16
29	75	76	76	78	74	4	88	10	70	4	S.E.	S.E.	71·6	74·3	72·9	·774	·848	.811	89	94	91·5	10	10	10	R	R	R	·09
30	80	81	80·5	85	74	11	118	33	70	4	S.E.	S.E.	77·3	79	78·1	·937	1·000	·968	95	95	95	0	3	2	B	C	B	

Total 3·21

State Surgeon's Office,
Seremban, 10*th December*, 1906.

R. VAN GEYZEL,
Apothecary.

REGISTER OF RAINFALL AT NEGRI SEMBILAN HOSPITALS FOR NOVEMBER, 1906.

Date.	Seremban.		K. Pilah.		Tampin.		Jelebu.		Port Dickson.		Mantin.	
	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.
1	...	...	...	...	...	...	.	.	...	...	...	...
2	...	...	...	...	...	...	..	..	...	..	...	...
3	...	...	...	...	...	...	...	...	...	12	...	...
4	...	...	...	...	...	60	...	...	...	07	...	04
5	...	...	...	...		...	..	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	02	...	...
7	...	...	...	16	...	05	..	08	...	28	...	15
8	...	23	...	07	...	33	...	30	...	25	...	41
9	...	10	...	...	...	20	...	13	...	31	...	...
10	...	05	...	03	...	27	...	...	...	62	...	25
11	...	20	...	12	...	36	...	...	...	21	...	21
12	...	25	1	18	2	68	1	14	...	78	...	75
13	...	...	...	32	2	18	...	45	...	...	...	71
14	...	...	...	62	...	20	...	...	..	...	...	...
15	...	...	...	07	...	...	...	12	...	...	...	...
16	...	...	...	29	...	...	...	...	...	10	...	...
17	1	12	...	68	...	18	.	...	...	08	...	...
18	...	90	...	..	...	45	...	...	...	...	...	47
19	...	...	...	...	...	12	...	15	...	36	...	02
20	...	..	...	...	...	...	...	09	...	...	...	...
21	...	...	...	...	...	...	...	...	...	...	...	...
22	...	...	...	...	...	...	...	09	..	65	...	...
23	...	...	...	...	...	10	...	...	...	...	...	33
24	..	05	...	...	...	...	...	16	...	...	...	...
25	...	...	...	57	...	05	...	19	...	...	...	13
26	...	06	...	03	...	10	...	09	...	02	...	06
27	...	...	...	02	...	...	...	32	...	...	...	26
28	...	16	1	08	...	50	...	59	...	08	...	23
29	...	09	...	37	...	10	...	...	...	15	...	44
30	...	...	...	21	...	70	...	...	2	00	...	47
Total	3	21	5	82	9	17	3	90	6	10	4	93

State Surgeon's Office,
Seremban, 11*th December*, 1906.

R. VAN GEYZEL,
Apothecary.

REGISTER OF RAINFALL AT NEGRI SEMBILAN HOSPITALS FOR DECEMBER, 1906.

Date.	Seremban.		K. Pilah.		Tampin.		Jelebu.		Port Dickson.		Mantin.	
	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.	In.	dcs.
1	2	94	...	16	...	10	...	08	3	90	...	97
2	...	05	...	...	...	90	...	45	...	06	...	...
3	...	34	1	30	...	40	...	...	...	37	...	82
4	...	05	...	04	...	05	...	...	1	05	...	14
5	...	...	...	05	...	...	...	...	...	51	...	...
6	...	35	...	04	...	16	...	43	...	...	...	15
7	...	32	1	44	...	08	1	28	...	...	...	51
8	...	...	...	05	...	...	...	01	...	...	...	05
9	2	13	...	07	1	15	...	...	...	39	...	04
10	...	18	...	87	1	83	...	...	1	20	...	41
11	...	53	...	58	...	05	...	03	...	17	...	33
12	...	06	...	66	...	...	...	...	...	19	...	03
13	1	23	...	17	...	30	...	55	...	50	...	13
14	...	...	1	22	...	18	...	57	1	08	...	30
15	...	90	...	30	...	20	...	...	...	60	...	10
16	...	...	...	...	...	...	...	...	...	04	...	...
17	1	27	...	12	...	...	...	35	...	08	...	80
18	...	70	...	19	...	10	...	...	...	82	...	81
19	...	88	...	02	...	30	...	...	...	17	...	...
20	...	39	...	08	...	50	...	...	...	87	1	04
21	...	07	...	...	...	...	...	...	...	...	...	66
22	...	...	...	...	...	...	...	...	...	04	...	...
23	...	...	...	13	...	15	...	...	...	...	...	05
24	1	05	1	04	...	68	1	15	1	66	1	25
25	...	73	1	40	1	20	...	90	...	89	1	26
26	...	...	...	03	...	25	...	02	...	...	...	...
27	...	29	...	22	...	33	...	20	...	86	...	30
28	1	02	1	08	1	75	1	36	2	25	1	32
29	...	57	...	34	...	30	...	...	...	93	...	69
30	...	...	...	...	...	...	1	42	...	06	...	...
31	...	74	...	30	...	45	...	...	...	10	1	23
Total	16	79	11	90	11	41	8	80	18	79	13	39

STATE SURGEON'S OFFICE,
SEREMBAN, 10*th January*, 1907.

R. VAN GEYZEL,
Apothecary

Abstract of Meteorological Report 1902-06.

CHRISTMAS ISLAND.	Mean Barometer at 32° F and Sea Level.	Mean dry bulb.	Mean Maximum.	Mean Minimum.	Mean Temperature Maximum and Minimum 2.	Mean Wet Bulb.	Humidity %.	Rainfall.	No. of days rain fell.
1902	29·912	78·8	87·4	74·4	80.9	74·5	79·0	66·34	153
1903	29·883	78·8	88·0	74·6	81·3	75·0	81·0	69·90	156
1904	29·868	77·4	86·6	73·5	80·0	74·5	84·7	104·43	179
1905	29·891	78·4	87·7	74·1	80·9	74·7	81·4	60·34	149
1906	29·849	79·3	87·3	75·1	81·2	76·0	84·8	107·76	189

D. R. TAIT.

December 31*st*, 1906.

Singapore.

Abstract of Meteorological Readings for the month of November, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F.	°F.	°F.	°F.	°F.	°F.	Ins.	°F	%		Ins.	Ins.
Kandang Kerbau Hospital Observatory	29·936	144·5	79·9	88·2	74·5	13·7	77·2	·868	75·3	81	N. W.	12·74	2·27

A. B. LEICESTER,
Meteorological Observer

D. K. McDOWELL,
Principal Civil Medical Officer, S. S.

KANDANG KERBAU HOSPITAL OBSERVATORY,
SINGAPORE, 29*th December*, 1906.

Penang.

Abstract of Meteorological Readings in the Criminal Prison Observatory for the month of November, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29·920	145·9	78·7	86·9	72·5	14·4	75·6	·817	73·47	78·0	N.W	16·79	3·30

PRISON OBSERVATORY,
PENANG, 10*th December*, 1906.

M. E. SCRIVEN,
Assistant Surgeon.

E. N. GRAHAM,
for Colonial Surgeon, Penang.

Malacca.

Abstract of Meteorological Readings for the month of November, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Durian Daun Hospital	Barometer out of order.	143·0	81·0	88·2	75·1	13·1	78·3	·902	72·9	81	N.W.	2·63	·99

COLONIAL SURGEON'S OFFICE,
MALACCA, 31*st December*, 1906.

F. B. CROUCHER,
Colonial Surgeon, Malacca.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of November, 1906.

DISTRICT.	Maximum in Sun.	Temperature.				Hygrometer.			Total Rainfall.	Greatest rainfall during 24 hours.
		Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Humidity.		
Taiping ...	150	78·40	91	70	21	76·34	881	91	18·99	5·89
Kuala Kangsar ...	...	77·57	91	68	23	75·43	854	91	6·82	2·02
Batu Gajah ...	159	77·72	91	69	22	75·93	875	92	5·75	1·27
Gopeng ...	...	76·97	92	66	26	77·72	...	...	11·52	2·79
Ipoh ...	...	78·57	91	73	18	76·18	873	90	5·23	·74
Kampar ...	...	...	92	69	23	...	...	...	11·85	2·15
Teluk Anson ...	...	78·31	91	66	25	76·83	903	93	13·76	2·96
Tapah ...	..	78·01	92	68	24	76·08	872	91	10·77	3·17
Parit Buntar ..	...	79·24	90	70	20	76·83	895	89	12·73	2·10
Bagan Serai ...	...	78·52	91	70	21	76·57	887	91	8·54	1·18
Selama ...	...	78·13	93	69	24	75·80	892	90	15·46	2·73

STATE SURGEON'S OFFICE,

TAIPING, 11*th December*, 1906.

S. C. G. FOX,

Acting State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of November, 1906.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	29·885	148·1	80·2	89·9	71·4	18·5	76·2	0·829	73·5	80	S.W.	5·51	2·00
Pudoh Gaol Hospital "	...	...	...	...	...	...	...	...	...	...	...	3·61	1·84
District Hospital "	...	...	...	...	...	...	...	...	...	...	...	5·85	1·63
" Klang	...	...	...	86·7	69·3	17·4	...	...	...	...	...	5·20	1·56
" Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	4·50	1·16
" Kajang	...	...	...	88·9	71·5	17·4	...	...	...	...	...	6·24	1·66
" Kuala Selangor	...	...	...	...	...	...	...	...	...	...	...	2·68	0·68
" Kuala Kubu	...	...	...	...	...	...	...	...	...	...	...	13·24	1·62
" Serendah	...	...	...	...	...	...	...	...	...	...	...	6·43	1·38
" Rawang	...	...	...	88·5	72·2	16·3	...	...	...	...	...	5·57	1·65
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	4·21	0·88
Sabah Bernam	...	...	...	...	...	...	...	...	...	...	...	5·16	1.89

E. A. O. TRAVERS,

State Surgeon, Selangor.

STATE SURGEON'S OFFICE,

KUALA LUMPUR, 14*th December*, 1906.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of November, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	91·0	68·0	18·20	...	...	...	...	...	7·89	1·25
Raub ...	...	...	...	92·0	67·0	15·30	...	...	...	...	...	8·97	1·99
Bentong ...	...	...	...	96·0	67·5	19·0	...	...	...	...	...	7·98	1·50
Temerloh ...	...	...	...	90·0	71·0	12·80	...	...	...	...	...	11·14	2·80
Pekan ...	...	...	...	90·0	72·0	11·70	...	...	...	...	...	20·88	5·47
Kuantan ...	...	...	...	93·0	70·0	15·51	...	...	...	...	...	28·03	7·14

STATE SURGEON'S OFFICE,

RAUB, *7th January*, 1907.

W. H. FRY,

State Surgeon, Pahang.

Penang.

Abstract of Meteorological Readings in the Criminal Prison Observatory for the month of December, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Mean Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Mean Maximum.	Mean Minimum.	Mean Range.	Mean Wet Bulb.	Mean Vapour Tension.	Mean Dew Point.	Mean Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	°F	%		Ins.	Ins.
Criminal Prison Observatory	29·918	146·8	78·3	86·8	73·7	13·1	75·8	·838	73·08	82	N. W.	11·20	1·52

COLONIAL SURGEON'S OFFICE,
PENANG, 11th *January*, 1907.

M. E. SCRIVEN,
Assistant Surgeon.

T. C. MUGLISTON,
Colonial Surgeon, Penang.

Malacca.

Abstract of Meteorological Readings for the month of December, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
	Ins.	°F	°F	°F	°F	°F	°F	°F	%	%		Ins.	Ins.
Durian Daun Hospital ...	...	150·0	79·9	88·4	74·6	13·8	76·5	·843	70·8	78	N.W.	11·11	1·65

F. B. CROUCHER,
Colonial Surgeon, Malacca.

COLONIAL SURGEON'S OFFICE,
MALACCA, 31*st January*, 1907.

Perak.

Abstract of Meteorological Readings in the various Districts of the State for the month of December, 1906.

DISTRICT.		Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
				Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Taiping	...	...	143	78·44	89	70	19	75·96	865	...	89	...	22·43	3·39
Kuala Kangsar	...	...	...	78·91	92	69	23	75·39	834	...	84	...	12·27	3·52
Batu Gajah	...	...	157	78·88	90	70	20	75·77	852	...	86	...	18·64	3·18
Gopeng	...	...	...	78·36	91	65	26	76·23	877	...	90	...	13·15	2·70
Ipoh	...	...	...	78·68	94	71	23	76·14	868	...	89	...	17·25	2·71
Kampar	...	...	...	...	89	70	19	...	...	...	...	..	19·44	4·50
Teluk Anson	...	...	...	79·33	89	64	25	76·54	876	...	88	...	18·09	4·57
Tapah	...	...	...	78·34	90	69	21	75·68	855	...	88	...	18·90	3·05
Parit Buntar	...	...	...	79·38	88	70	18	76·20	862	...	86	...	13·26	1·80
Bagan Serai	...	...	...	79·65	89	72	17	76·75	880	...	87	...	16·60	4·93
Selama	...	...	...	79·07	91	72	19	75·87	850	...	86	...	18·20	6·35

STATE SURGEON'S OFFICE,
TAIPING, 11*th January*, 1907.

S. C. G. FOX,
Acting State Surgeon, Perak.

Selangor.

Abstract of Meteorological Readings in the various Districts of the State for the month of December, 1906.

District.			Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
					Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
General Hospital, Kuala Lumpur	...	...	29·879	139·4	78·9	88·4	71·6	16·8	75·7	0·827	73·5	83	S.W.	14·94	2·85
Pudoh Gaol Hospital ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	12·57	2·33
District Hospital ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	15·51	3·00
,, Klang	...	...	...	...	...	86·0	70·0	16·0	...	...	...	...	...	23·31	5·82
,, Kuala Langat	...	...	...	...	...	...	...	...	...	...	...	...	...	16·63	2·34
,, Kajang	...	...	...	...	...	86·6	72·1	14·5	...	...	...	...	...	12·79	2·01
,, Kuala Selangor	...	...	...	...	...	...	...	...	...	...	...	...	...	13·35	2·75
,, Kuala Kubu	...	...	...	...	...	...	...	...	...	...	...	...	...	14·57	2·47
,, Serendah	...	...	...	...	...	...	...	...	...	...	...	...	...	22·13	1·84
,, Rawang	...	...	...	...	...	86·4	71·4	15·0	...	...	...	...	...	16·79	2·25
Beri-beri Hospital, Jeram	...	...	...	...	...	...	...	...	...	...	...	...	...	10·97	2·60
Sabah, Bernam ...	...	...	...	...	...	...	...	...	...	...	...	...	..	12·20	1·50

State Surgeon's Office,
Kuala Lumpur, 14*th January*, 1907.

E. A. O. TRAVERS,
State Surgeon, Selangor.

Pahang.

Abstract of Meteorological Readings in the various Districts of the State for the month of December, 1906.

DISTRICT.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension.	Dew Point.	Humidity.			
Kuala Lipis ...	...	...	...	89·0	67·0	14·77	...	...	...	...	...	14·29	2·62
Raub ...	...	...	...	89·0	60·0	13·29	...	...	...	...	...	14·21	2·94
Bentong ...	...	...	...	88·0	70·0	13·53	...	...	...	...	...	16·46	1·63
Temerloh ...	...	...	...	86·0	70·0	10·25	...	...	...	...	...	19·69	3·10
Pekan ...	...	...	...	88·0	70·0	8· 3	...	...	...	...	...	63·78	12·24
Kuantan ...	...	...	...	89·0	69·0	12·83	...	...	...	...	...	64·85	8·70

STATE SURGEON'S OFFICE,

RAUB, 28*th January*, 1907.

W. H. FRY,

State Surgeon, Pahang.

METEOROLOGICAL OBSERVATIONS.

Table Showing the Daily Results of the Reading of Meteorological Observations taken at the General Hospital, Seremban, for the Month of December, 1906.

Date.	Temperature of Radiation.										Wind.		Temperature of evaporation.			Computed vapour tension.			Relative humidity.			Clouds 0 to 10.			Clouds and weather Initials.			Rain.
											Direction.																	
	9 H	15 H	Mean.	Maximum.	Minimum.	Range.	Sun.	Difference sun and shade.	Grass.	Difference shade and radiation.	9 H	15 H	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	9 H	15 H	Mean.	Inches.
	°	°	°	°	°	°	°	°	°	°			°	°	°	in.	in.	in.	°	°	°							
1	77	75	76	87	71	16	100	13	69	2	S.E.	E.	73·6	71·6	72·6	0·829	0·774	0·801	89	89	89	5	10	10	C	R	R	2·94
2	82	83	82·5	85	70	15	120	35	68	2	S.E.	S.E.	73·6	74·7	74·1	·830	·856	·843	76	76	76	3	3	5	C	C	C	·05
3	77	78	77·5	84	71	13	105	21	69	2	S.E.	S.E.	73·6	74·6	74·1	·829	·857	·843	89	89	89	3	10	10	C	R	R	·34
4	78	86	82	87	71	16	140	53	70	1	S.E.	S.E.	72·9	74	73·4	·810	·855	·832	84	68	76	3	5	2	C	C	B	·05
5	82	92	87	92	72	20	142	50	70	2	S.E.	S.E.	73.6	75·9	74·7	·830	·894	·862	76	59	67·5	0	0	2	B	B	B	
6	83	84	83·5	85	71	14	125	40	69	2	S.E.	E.	69·7	75·7	72·7	·724	·888	·806	64	76	70	0	3	5	B	C	C	·35
7	80	86	83	88	71	17	96	8	70	1	E.	E	75	75	75	·867	·873	·870	85	72	78·5	10	10	10	R	R	R	·32
8	75	85	80	87	71	16	125	38	70	1	E.	S.E.	71·6	75·7	73·6	·774	·888	·831	89	76	82·5	8	3	3	O	C	C	
9	81	87	84	88	71	17	146	58	68	3	E.	E.	74	77·1	75·5	·849	·933	·891	80	73	76·5	2	10	5	B	R	C	2·13
10	77	76	76·5	77	71	6	145	68	69	2	E.	S.E.	73·6	74·3	73·9	·829	·848	·838	89	94	91·5	3	10	5	C	R	C	·18
11	76	77	76·5	78	71	7	140	62	70	1	S.E.	S.E.	72·6	75·3	73·9	801	·877	·839	89	94	91·5	3	10	5	C	R	C	·53
12	77	80	78·5	81	72	9	141	60	69	3	S.E.	E.	73·6	73·3	73·4	·829	·820	·824	89	80	84·5	3	3	5	C	C	C	·06
13	77	78	77·5	79	69	10	128	49	64	5	S.E.	E.	71·9	74·6	73·2	·783	·857	·820	84	89	86·5	5	10	5	C	R	C	1·23
14	78	83	80·5	85	69	16	138	53	68	1	E.	S.E.	72·9	74·7	73·8	·810	·856	·833	84	76	80	3	8	8	C	O	O	
15	77	80	78·5	81	68	13	102	21	68	0	E.	E.	73·6	73·3	73·4	·829	·820	·824	89	80	84·5	3	10	5	C	R	C	·90
16	79	82	80·5	84	69	15	152	68	68	1	E.	E.	73.9	73·6	73·7	·839	·830	·834	85	76	80·5	0	0	2	B	B	B	
17	81	82	81·5	83	71	12	100	17	69	2	S.E.	E.	74	73·6	73.8	·849	·830	·839	80	76	78	2	10	10	B	R	R	1·27
18	76	77	76·5	80	71	9	123	43	68	3	S.E.	S E.	72·6	75·3	73·9	·801	·877	.839	89	94	91·5	3	5	10	C	C	R	·70
19	80	82	81	83	70	13	141	58	68	2	S.E.	S.E.	75	75·3	75·1	·867	·877	·872	85	80	82·5	0	0	10	B	B	R	·88
20	76	77	76·5	81	71	10	141	60	69	2	S.E.	S.E.	74·3	75·3	74·8	·848	·877	·862	94	94	94	10	10	10	R	R	R	·39
21	76	78	77	82	70	12	143	61	68	2	E.	E.	74·3	74·6	74·4	·848	·857	·852	94	89	91·5	8	10	5	O	R	C	·07
22	81	85	83	85	72	13	143	58	69	3	S.E.	S.E.	74	75	74·5	·849	·873	·861	80	72	76	0	0	2	B	B	B	
23	81	82	81·5	84	71	13	143	59	67	4	E.	S.E.	74	73·6	73·8	·849	·830	·889	80	76	78	0	3	2	B	C	B	
24	80	80	80	83	71	12	141	58	68	3	S.E.	S.E.	75	75	75	·867	·867	·867	85	85	85	0	5	10	B	C	R	1·05
25	77	76	76·5	80	71	9	141	61	64	7	E.	E.	73·6	76	74·8	·829	·897	·863	89	100	94·5	10	10	10	R	R	R	·73
26	80	87	83·5	90	72	18	132	42	68	4	E.	E.	75	77·1	76	·867	·933	·850	85	73	79	0	0	2	B	B	B	
27	78	76	77	80	70	10	120	40	68	2	S.E.	S.	72·9	74·3	73·6	·810	·848	·829	84	94	89	3	10	3	C	R	C	·29
28	75	75	75	80	71	9	125	45	67	4	S.E.	E.	75	75	75	·868	·868	·868	100	100	100	10	10	10	R	R	R	1·02
29	76	80	78	88	71	17	140	52	67	4	E.	S.E.	72·6	73·3	72·9	·801	·820	.810	89	80	84·5	10	3	2	B	C	B	·57
30	80	87	83·5	90	70	20	152	62	68	2	S.E.	E.	75	77·1	76	·867	·933	·900	85	73	79	0	0	0	B	B	B	
31	79	80	79·5	81	69	12	145	64	68	1	E.	E.	73·9	73·3	73·6	·839	.820	·829	85	80	82·5	0	3	10	B	C	R	

Total 16·79

STATE SURGEON'S OFFICE,
SEREMBAN, 10*th January*, 1907.

R. VAN GEYZEL,
Apothecary.